Vol. 1107 Number 2

OFFICIAL GAZETTE

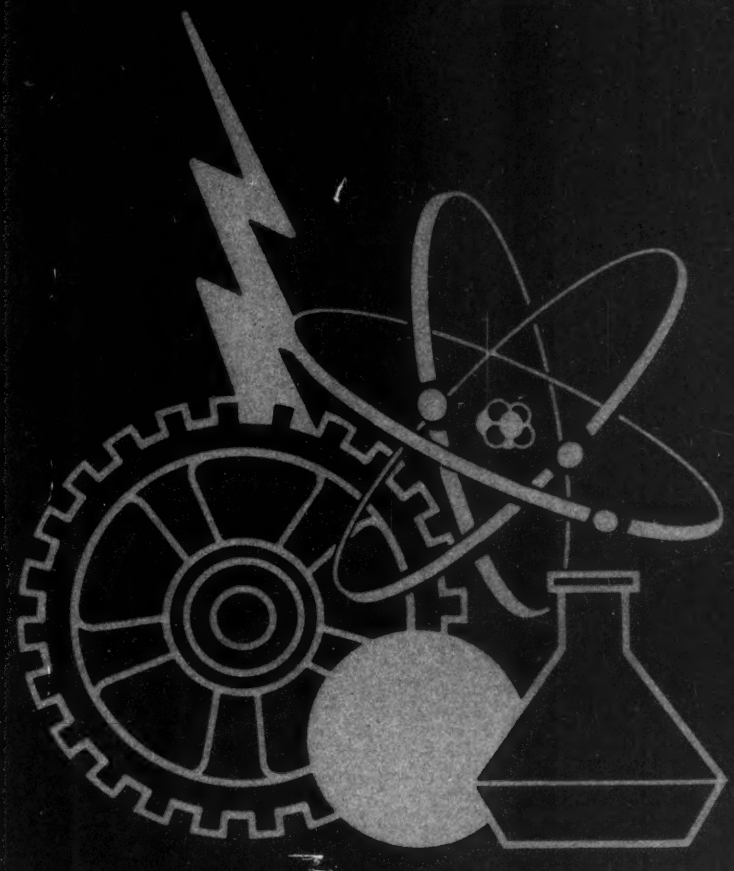
of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

October 10, 1989



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OFFICIAL GAZETTE of the
UNITED STATES PATENT AND TRADEMARK OFFICE

October 10, 1989 Volume 1107 Number 2

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed.

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $10.00 each; copies of TRADEMARKS at $1.50 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1107 O.G. 5 on Oct. 3, 1989.

For use of the European Patent Office as a Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 5 on Sept. 28, 1982.

For use of the European Patent Office as an international Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of Sept. 1, 1989, and was announced in the *Official Gazette* at 1105 O.G. 36 on Aug. 15, 1989.

International PCT fees were changed on June 1, 1989 due to a difference in the exchange rate of the U.S. dollar in relation to the Swiss Franc and were announced in the *Official Gazette* at 1102 O.G. 90 on May 30, 1989.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office as Searching Authority (ISA)	
—No corresponding prior U.S. national application filed:	550.00
—Corresponding prior U.S. national application filed:	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as Searching Authority	1040.00
Preliminary examination fee	
U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as Searching Authority.	400.00
—Additional examination fee, per additional invention	130.00
—Searching Authority not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee:	436.00
Basic Supplemental fee (for each page over 30):	9.00
Designation fee per country or region for the first 10 national or regional offices:	106.00
Designation fee for 11th and subsequent designations:	No Charge
Handling fee:	134.00

U.S. National Stage fees

	Small Entity	Non-small Entity
U.S. Patent and Trademark Office was Preliminary Examining Authority (IPEA)	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1	30.00	30.00

September 12, 1989. DONALD J. QUIGG,
Assistant Secretary and Commissioner of Patents and Trademarks.

Status of Appeal Cases

The Date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting Assignment to Panel For A Decision Without a Hearing as of August 31, 1989.

Chemical Discipline -	February 1, 1988
Mechanical Discipline -	May 2, 1988
Electrical Discipline -	April 13, 1988

The Date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting Hearing as of August 31, 1989.

Chemical -	October 1, 1987
Electrical -	December 1, 1987
Mechanical -	August 4, 1987

Board of Patent Appeals and Interferences Decisions Rendered in Ex Parte Appeals During the Month of August 1989.

Affirmed	262
Affirmed-in-Part	56
Reversed	208
Total Decided	526

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on October 7, 1986, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,615,046 through 4,616,364
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on October 5, 1982 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,352,211 through 4,353,132
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

" (e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00"

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)).....$245.00
By other than a small entity.....$490.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f)).....$495.00
By other than a small enttity.....$990.00"

The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982.....$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f)).....$60.00
By other than a small entity.....$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED JULY 23, 1989
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,530,111	06/527,167	07/23/85
4,530,112	06/488,480	07/23/85
4,530,119	06/518,828	07/23/85
4,530,122	06/385,971	07/23/85
4,530,129	06/421,469	07/23/85
4,530,136	06/422,738	07/23/85
4,530,137	06/606,987	07/23/85
4,530,142	06/543,410	07/23/85
4,530,148	06/576,797	07/23/85
4,530,152	06/481,523	07/23/85
4,530,154	06/583,885	07/23/85
4,530,158	06/502,094	07/23/85
4,530,163	06/555,531	07/23/85
4,530,171	06/562,201	07/23/85
4,530,173	06/510,767	07/23/85
4,530,175	06/519,020	07/23/85
4,530,191	06/344,756	07/23/85
4,530,196	06/467,035	07/23/85
4,530,200	06/502,335	07/23/85
4,530,202	06/457,063	07/23/85
4,530,204	06/644,477	07/23/85
4,530,205	06/530,487	07/23/85
4,530,206	06/528,958	07/23/85
4,530,208	06/473,284	07/23/85
4,530,211	06/635,670	07/23/85
4,530,219	06/575,005	07/23/85
4,530,221	06/530,706	07/23/85
4,530,224	06/533,609	07/23/85
4,530,239	06/599,235	07/23/85
4,530,240	06/551,892	07/23/85
4,530,255	06/585,633	07/23/85
4,530,257	06/502,453	07/23/85
4,530,260	06/594,220	07/23/85
4,530,261	06/565,590	07/23/85
4,530,262	06/501,063	07/23/85
4,530,266	06/560,227	07/23/85
4,530,274	06/371,412	07/23/85
4,530,277	06/620,200	07/23/85
4,530,280	06/570,492	07/23/85
4,530,291	06/535,177	07/23/85
4,530,293	06/387,466	07/23/85
4,530,299	06/629,568	07/23/85
4,530,306	06/568,920	07/23/85
4,530,310	06/567,420	07/23/85
4,530,331	06/593,990	07/23/85
4,530,346	06/619,731	07/23/85
4,530,348	06/478,668	07/23/85
4,530,349	06/558,621	07/23/85
4,530,350	06/592,216	07/23/85
4,530,361	06/634,340	07/23/85
4,530,362	06/512,251	07/23/85
4,530,377	06/521,486	07/23/85
4,530,384	06/543,587	07/23/85
4,530,386	06/545,336	07/23/85
4,530,388	06/509,353	07/23/85
4,530,390	06/514,659	07/23/85
4,530,392	06/496,750	07/23/85
4,530,397	06/480,763	07/23/85
4,530,399	06/546,937	07/23/85
4,530,408	06/479,716	07/23/85

Patent Number	Serial Number	Issue Date
4,530,411	06/514,984	07/23/85
4,530,426	06/446,919	07/23/85
4,530,431	06/447,295	07/23/85
4,530,433	06/492,594	07/23/85
4,530,439	06/653,895	07/23/85
4,530,440	06/482,339	07/23/85
4,530,445	06/425,228	07/23/85
4,530,448	06/493,625	07/23/85
4,530,467	06/465,684	07/23/85
4,530,472	06/623,093	07/23/85
4,530,479	06/539,812	07/23/85
4,530,482	06/262,518	07/23/85
4,530,488	06/510,638	07/23/85
4,530,493	06/635,564	07/23/85
4,530,496	06/461,535	07/23/85
4,530,499	06/430,558	07/23/85
4,530,500	06/622,959	07/23/85
4,530,504	06/496,144	07/23/85
4,530,508	06/398,106	07/23/85
4,530,514	06/485,022	07/23/85
4,530,537	06/529,294	07/23/85
4,530,549	06/557,480	07/23/85
4,530,561	06/394,221	07/23/85
4,530,563	06/431,850	07/23/85
4,530,567	06/377,816	07/23/85
4,530,570	06/482,959	07/23/85
4,530,577	06/520,956	07/23/85
4,530,584	06/462,808	07/23/85
4,530,591	06/484,540	07/23/85
4,530,607	06/639,505	07/23/85
4,530,619	06/422,538	07/23/85
4,530,629	06/424,061	07/23/85
4,530,638	06/558,002	07/23/85
4,530,639	06/577,359	07/23/85
4,530,641	06/485,540	07/23/85
4,530,644	06/666,136	07/23/85
4,530,646	06/484,235	07/23/85
4,530,647	06/578,370	07/23/85
4,530,659	06/566,521	07/23/85
4,530,660	06/584,637	07/23/85
4,530,661	06/650,658	07/23/85
4,530,685	06/467,342	07/23/85
4,530,715	06/438,448	07/23/85
4,530,717	06/459,011	07/23/85
4,530,728	06/669,146	07/23/85
4,530,732	06/476,220	07/23/85
4,530,733	06/559,885	07/23/85
4,530,734	06/458,460	07/23/85
4,530,735	06/425,573	07/23/85
4.530,738	06/430,625	07/23/85
4,530,740	06/604,838	07/23/85
4,530,748	06/611,112	07/23/85
4,530,755	06/547,086	07/23/85
4,530,760	06/452,976	07/23/85
4,530,769	06/479,965	07/23/85
4,530,782	06/576,157	07/23/85
4,530,785	06/601,697	07/23/85
4,530,802	06/415,110	07/23/85
4,530,803	06/660,570	07/23/85
4,530,805	06/607,163	07/23/85
4,530,806	06/386,337	07/23/85
4,530,814	06/377,721	07/23/85
4,530,827	06/545,427	07/23/85
4,530,836	06/611,538	07/23/85
4,530,843	06/545,159	07/23/85
4,530,845	06/511,268	07/23/85
4,530,849	06/583,792	07/23/85
4,530,852	06/570,743	07/23/85
4,530,853	06/617,932	07/23/85
4,530,867	06/543,015	07/23/85
4,530,884	06/471,897	07/23/85
4,530,918	06/545,521	07/23/85
4,530,930	06/562,735	07/23/85
4,530,936	06/512,193	07/23/85
4,530,947	06/603,396	07/23/85
4,530,949	06/632,523	07/23/85
4,530,954	06/571,710	07/23/85
4,530,978	06/531,657	07/23/85
4,530,980	06,579,052	07/23/85
4,530,995,	06/509,481	07/23/85
4,531,002	06/641,618	07/23/85
4,531,006	06/265,735	07/23/85
4,531,014	06/577,842	07/23/85
4,531,018	06/561,646	07/23/85
4,531,023	06/408,024	07/23/85
4,531,026	06/476,228	07/23/85
4,531,032	06/558,325	07/23/85
4,531,041	06/464,000	07/23/85
4,531,045	06/624,888	07/23/85
4,531,050	06/313,271	07/23/85
4,531,063	06/404,387	07/23/85
4,531,076	06/446,091	07/23/85
4,531,082	06/523,753	07/23/85
4,531,086	06/446,334	07/23/85
4,531,091	06/363,219	07/23/85
4,531,095	06/585,926	07/23/85
4,531,105	06/452,774	07/23/85
4,531,108	06/581,322	07/23/85
4,531,109	06/479,448	07/23/85
4,531,115	06/402,154	07/23/85
4,531,121	06/437,602	07/23/85
4,531,125	06/392,749	07/23/85
4,531,127	06/598,442	07/23/85
4,531,168	06/416,330	07/23/85
4,531,169	06/353,690	07/23/85
4,531,180	06/217,545	07/23/85
4,531,187	06/435,776	07/23/85
4,531,208	06/351,999	07/23/85
4,531,219	06/519,045	07/23/85
4,531,230	06/388,439	07/23/85
4,531,237	06/554,170	07/23/85

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1,21(b)).

4,567,738, Re. S. N. 152,407, Filed Feb. 4, 1988, Cl. 66/85.A, STRUCTURAL FABRIC AND METHOD FOR MAKING SAME, Harold K. Hutson et al., Owner of Record: *Knytex Inc. Minneapolis, Minn.*, Attorney or Agent: Norman F. Oblon, Ex. Gp.: 247

4,656,166, Re. S. N. 338,166, Filed Apr. 14, 1989, Cl. 123/643, CRANK ANGLE DETECTING SYSTEM FOR ENGINES, Haruo Yuzawa et al., Owner of Record: *Nissan Motor Company. Ltd., Kanagawa-Ken, Japan*, Attorney or Agent: John J. Feldhaus, Ex. Gp.: 342

4,681,483, Re. S. N. 381,900, Filed Aug. 22, 1989, Cl. 405/267, CASTING OF STRUCTURAL WALLS, Paul Camilleri, Owner of Record: *Foundation Techology (Aust) PYT Ltd.*, Attorney or Agent: Charles M. Marmelstein, Ex. Gp.: 351

4,689,932, Re. S. N. 400,677, Filed Aug. 30, 1989, Cl. 52/648, PORTABLE SHELTER ASSEMBLIES, Theodore R. Zeigler, Owner of Record: *World Shelters Inc., Springfield, Virgina*, Attorney or Agent: Mark D. Schuman, Ex. Gp.: 354

4,690,287, Re. S. N. 400,149, Filed Aug. 29, 1989, Cl. 211/49.1, GRAVITY FEED DISPLAY DEVICE, Jane S. Fershko et al., Owner of Record: *Mead Corp., Dayton, Ohio*, Attorney or Agent: Walter M. Rodgers, Ex. Gp.: 355

4,690,405, Re. S. N. 398,263, Filed Aug. 24, 1989, Cl. 273/73C, TENNIS RACKET, Jack L. Frolow, Owner of Record: *Inventor*, Attorney or Agent: None, Ex. Gp.: 334

4,691,375, Re. S. N. 399,583, Filed Aug. 28, 1989, Cl. 455/071, DATA TRANSMISSION USING A TRANSPARENT

TONE-IN BAND SYSTEM, Joseph P. McGeehan et al., Owner of Record: *National Reasearch Development Corp., London, England,* Attorney or Agent: Scott C. Harris, Ex. Gp.: 263

4,748,163, Re. S. N. 400,200, Filed Aug. 29, 1989, Cl. 514/194, NOVEL B-LACTAM ANTIBIOTICS, Gunter Schmidt et al., Owner of Record: *Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany,* Attorney or Agent: Leonard Horn, Ex. Gp.: 125

4,750,118, Re. S. N. 398,379, Filed Aug. 24, 1989, Cl. 364/400, CODING SYSTEM FOR MULTIPLE TRANSMITTERS AND SINGLE RECEIVER FOR A GARAGE DOOR OPENER, Carl Heitschel et al., Owner of Record: *The Chamberlain Group Inc., Elmhurst, Ill.,* Attorney or Agent: Richard B. Wakely, Ex. Gp.: 236

4,755,911, Re. S. N. 380,106, Filed July 14, 1989, Cl. 361/414, MULTILAYER PRINTED CIRCUIT BOARD, Hirosuke Suzuki, Owner of Record: *Junkosha Company Ltd., Tokyo, Japan,* Attorney or Agent: E. Alan Uebler, Ex. Gp.: 215

4,830,203, Re. S. N. 399,903, Filed Aug. 29, 1989, Cl. 211/105.2, SUPPORT FOR DISPLAY ITEMS OR THE LIKE, Jan S. Ennis, Owner of Record: *Enaco Opitcal Incorporated, Kirkiand, Va.,* Attorney or Agent: Robert A. Jensen, Ex. Gp.: 355

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

4,392,580, Reexam. No. 90/001,836, Requested Aug. 31, 1989, Cl. 215/332, CLOSURE CAP, Charles S. Ochs, Owner of Record: *Anchor Hocking Corp. Lancaster, Ohio,* Attorney or Agent: Richard H. Evans, Ex. Gp.: 240, Requester: Owner

4,449,345, Reexam. No. 90/001,835, Requested Aug. 31, 1989, Cl. 52/506, INSULATION MODULE HARDWARE, Mack A. Haunsel, et al. Owner of Record: *Manville Sales Corp, Denver, Colo.,* Attorney or Agent: Robert F. Hess, Ex. Gp.: 350, Requester: Owner

4,577,958, Reexam. No. 90/001,833, Requested Aug. 28, 1989, Cl. 428/36, NON-FRAYING BREATHABLE FABRIC SUITABLE FOR USE AS A COTTON BALE COVER AND BAG FABRIC APPARATUS AND METHOD FOR MAKING THE SAME, Edward D. Barkis, et al., Owner of Record: *Standard Oil Inc. Chicago, Ill.,* Attorney or Agent: Stephen L Hensley, Ex. Gp.: 150, Requester: Synthetic Industries Inc. Chickamauga, Ga.

4,764,604, Reexam. No. 90/001,834, Requested Aug. 31, 1989, Cl. 536/103, DERIVATIVES OF GAMMA-CYCLODEXTRIN, Bernd W. W. Muller, Owner of Record: *Janssen Pharmaceutica N.V. Beerse, Belgium,* Attorney or Agent: Thomas A. Paintin Ex. Gp.: 180, Requester: Owner

4,797,170, Reexam. No. 90/001,837, Requested Sept. 6, 1989, Cl. 156/71, SYSTEM FOR HOLDING CARPET IN PLACE WITHOUT STRETCHING, Merle R. Hoopengardner, Owner of Record: *Jactac Inc., Lafayette, Calif.,* Attorney or Agent: Donald C. Feix, Ex. Gp.: 130, Requester: Orcon Corp., Union City, Calif.

Service by Publication

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceedings sent by certified mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is given that unless the registrants listed herein, their assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

On-Guard Corporation of America, Carlstadt, N.J., Reg. No. 888,974, for the mark "ON-GUARD", Canc. No. 17,835.

International Fragrance Corporation, Philadelaphia, Pa., Reg. No. 902,774 for the mark "EARTH", Canc. No. 17,856.

Betsy A. Kofoid and James P. Kofoid dba The Fun Company, Freeport, Ill., Reg. No. 1,317,242, for the mark "THE FUN COMPANY" and design, Canc. No. 17,895.

LFW Corporation, dba Traveling Light, San Francisco, Calif., Reg. No. 1,364,406 for the mark "TRAVELING LIGHT", Canc. No. 17,914.

Nandy Knits, Inc., New York, N.Y., Reg. No. 926,222 for the mark "BANANAS", Canc. No. 17,940.

Gourmet Food Products, Inc., Pasco, Wash., Reg. No. 957,930 for the mark "PETITE-OS, etc." and design, Canc. No. 17,969.

Kurt S. Mundahl and Sara D. Langworthy, Minneapolis, Minn., Reg. No. 1,359,307 for the mark "GRUNTS G" and design, Canc. No. 17,984.

Mite-T-Mart Corporation, Washington, D.C., Reg. No. 886,888 for the mark "MITE-T-MART", Canc. NO. 18,110.

Joel Rosenman, John Roberts and William Roberts dba The Three R's, New York, N.Y., Reg. Nos. 1,256,958 and 1,269,278 for the mark "A LITTLE SOMETHING" and design, Canc. No. 18,020.

Southern Seating & R.V. Products, Inc., St. Petersburg, Fla.,Reg. No. 1,351,593, for the mark "SOUTHERN" and design, Canc. No. 17,685.

Letot, Incorporated, Stratford, Conn., Reg. No. 1,006,025, for the mark "VERSATEL" and design, Canc. No. 17,733.

National Pet Products Corp., San Rafael, Calif., Reg. No. 1,391,279, for the mark "PETPRO NATIONAL PET PRODUCTS CORP." and design, Canc. No. 17,844.

Terson Company, Inc., Chicago, Ill., Reg. No. 575,987, for the mark "SIMPLE SIMON" and design, Canc. No. 17,889.

Kendale Technology Corp., Miami, Fl, Reg. No. 995,211, for the mark "ACCU-DIGIT", Canc. No. 17,896.

Taiho Industries Co., Ltd., New York, N.Y., Reg. No. 968,453, for the mark "KLIN VIEW", Canc. No. 17,677.

Identronix, Inc., Santa Cruz, Calif., Reg. No. 1,283,125, for the mark "IDX", Canc. No. 17,763.

Montrex Corporation, New York, N.Y., Reg. No. 336,639, for the mark "CIRCLE", Canc. No. 18,029.

Jetsoft, Inc., East Falmouth, Mass., Reg. No. 1,328,209, for the mark "BIZWIZ", Canc. No. 18,031.

Smokehouse Products, Inc., Landover, Md., Reg. No. 940,653, for the mark "HOFBERG'S", Canc. No. 18,040.

One On One Sports Training Center, Inc., Philadelphia, Pa., Reg. No. 1,427,857, for the mark "ONE ON ONE", Canc. No. 18,071.

ERMA S. BROWN
Administrator of the Trademark Trial and Appeal Board
For JEFFREY M. SAMUELS
Asistant Commissioner for Trademarks

Patents Available for License or Sale

Inquiries about the patents listed below should be directed to Shirk, Reist, Wyagenseller and Shirk, K.S. Shirk, Jr. Esquire at P.O. Box 1552, Lancaster, Pa., 17603

3,758,097	AUTOMATIC VISE JAW
3,792,851	AUTOMATIC VISE JAW
3,845,565	ANGLE MEASURING DEVICE
3,860,110	PIN ORIENTING, ALIGNING AND TAPING MACHINE

4,184,347 AIR HEATING AND CIRCULATING FIREPLACE GRATE

4,266,112-WEB-CUTTING PROCESS, William P. Niedermeyer, 1024 Mount Mary Drive, Green Bay, Wis. 54301
4,576,178-AUDIO SIGNAL GENERATOR, David Johnson, Box 68, 436 East 69th Street, New York, N.Y. 10021
4,702,704- TETRAHEDRAL CONDON STEREO-TABLE, Birch, Stewart, Kolash & Birch, Leonard R. Svensson, 301 N. Washington Street, P. O. Box 747, Falls Church, Va. 22046
4,763,932-HOSE COUPLING, Edward I. Matz, Esq., P.O. Box 5337, Daytona Beach, Fla. 32118
4,807,880-BALL SUPPORT DEVICE, Douglas E. White, Attorney at Law, 101 California Street, Suite 980, San Francisco, Calif. 94111
07/325,289-COMPUTER PROGRAM FOR PREVENTING THE FORMATTING OF A HARD DISK, Boyd W. Ghering, 551 Maple Ave., Doylestown, Pa. 18901

Patent Terms Extended Under 35 USC 156

A certificate extending the terms of the following patents were issued on September 18, 1989.

Patent No. 3,652,762, granted Mar. 28, 1972 to Alfred Sallmann, et al., Owner of Record: Ciba-Geigy Corp., Title: PHARMACEUTICAL COMPOSITIONS AND METHODS EMPLOYING SUBSTITUTED DERIVITIVES OF 2-ANILINOPHENYLACETIC ACIDS AND ESTERS, Classification: 524/60, Product Trade Name: Voltaren, Term Extended: 2 years

Patent No. 4,387,089, granted June 7, 1983 to Karl-Fred De Polo, Owner of Record: Givaudan Corp., Title: 4-(1,1-DIMETHYLETHYL)-4'-METHOXDIBENZOYLMETHANE, Classification: 424/59, Product Trade Name: Photoplex, Term Extended: 2 years

PATENT NOTICES

Certificates of Correction For Week of October 10, 1989

B1. 3,826,379	4,791,676	4,805,017	4,818,261
4,434,154	4,792,262	4,806,719	4,818,491
4,569,863	4,792,325	4,806,769	4,818,803
4,615,883	4,793,524	4,807,514	4,819,252
4,672,402	4,793,541	4,807,843	4,819,410
4,684,456	4,793,745	4,808,012	4,819,500
4,689,437	4,793,776	4,808,756	4,820,812
4,696,442	4,793,979	4,808,988	4,822,295
4,701,464	4,794,443	4,809,019	4,823,129
4,717,358	4,794,696	4,809,518	4,823,669
4,725,848	4,795,231	4,809,638	4,823,738
4,728,661	4,795,536	4,809,640	4,824,191
4,738,505	4,795,823	4,809,765	4,824,486
4,752,603	4,795,831	4,809,791	4,824,971
4,753,830	4,795,959	4,810,386	4,825,024
4,754,987	4,798,686	4,810,404	4,825,107
4,757,865	4,798,905	4,810,519	4,826,750
4,758,091	4,798,930	4,810,771	4,827,407
4,759,103	4,799,177	4,811,018	4,827,534
4,759,916	4,799,284	4,811,079	4,827,783
4,760,556	4,800,024	4,811,232	4,827,901
4,764,550	4,800,274	4,811,712	4,828,055
4,770,886	4,800,337	4,811,850	4,828,567
4,771,313	4,800,385	4,811,937	4,828,620
4,772,687	4,800,755	4,812,343	4,828,640
4,774,064	4,800,866	4,812,961	4,828,760
4,776,738	4,801,581	4,813,013	4,828,964
4,777,599	4,801,987	4,813,807	4,829,145
4,778,570	4,802,413	4,814,299	4,829,198
4,779,762	4,802,532	4,815,313	4,829,210
4,779,845	4,802,718	4,815,838	4,829,264
4,780,802	4,802,747	4,816,333	4,829,946
4,784,061	4,802,926	4,816,492	4,831,029
4,784,169	4,802,992	4,817,349	4,831,090
4,784,840	4,803,140	4,817,589	4,832,374
4,785,051	4,804,387	4,817,678	4,833,158
4,785,137	4,804,484	4,817,800	4,837,798
4,785,319	4,804,719	4,817,866	
4,768,188	4,804,749	4,818,218	

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Reference Collection of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to libary, ranging from patents of only recent years to all or most of the patents issued since 1790.

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Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

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	Pittsburgh, Carnegie Library of	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
Rhode Island	Providence Public Library	(401) 455-8027
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	Milwaukee Public Library	(414) 278-3247

PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner
CONDITION OF PATENT APPLICATIONS AS OF September 9, 1989

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	5-26-87
ORGANIC CHEMISTRY GROUP 120—S. N. ZAHARNA, Director	6-16-87
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	4-15-87
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	5-14-87
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director	7-30-86
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director	5-4-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	12-23-86
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—G. GOLDBERG, Director	5-28-87
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	5-27-88
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	8-18-87
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260 S. LEVY, Acting Director	7-2-87
DESIGN, GROUP 290—K. L. CAGE, Director	2-6-86
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	1-12-88
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Acting Director	4-13-88
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director	4-20-87
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director	2-26-88
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	10-3-88

Expiration of patents: The patents within the range of numbers indicated below expire during September 1989, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,688,314 to 3,694,813 inclusive
Plant Patents ..... None

REEXAMINATIONS

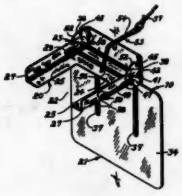
OCTOBER 10, 1989

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 3,965,838 (1137th)
BACKWASH BAFFLE AND STABILIZING DEVICE FOR PROPELLER DRIVEN WATERCRAFT

Frank O. Uht, Bellevue, Wash., assignor to R. Wayne Uht, Bellevue, Wash.

Reexamination Request No. 90/001,434, Feb. 1, 1988.
Reexamination Certificate for Patent No. 3,965,838, issued Jun. 29, 1976, Ser. No. 581,160, May 27, 1975.
Int. Cl.[4] B63H *25/48*
U.S. Cl. 114—145 A



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1–4, 7 and 9–11 are determined to be patentable as amended.

Claims 5, 6, 8, 12 and 13, dependent on an amended claim, are determined to be patentable.

7. A *combination trolling* backwash baffle and *cruise* stabilizing device mountable to the anticavitation plate of a drive unit for operation below the operative water line of a watercraft, comprising:

a mounting member adapted to be anchored to the anticavitation plate;

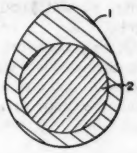
a plate member pivotably mounted to the mounting member for movement about an axis between (a) a [first] *trolling* position intersecting backwash produced by the drive unit *to slow the watercraft for trolling at low speeds*; and (b) a [second] *cruise* position angularly displaced from the [first] *trolling* position and in a plane parallel to the anticavitation plate *to guide the backwash to increase maneuverability at cruise speeds by reducing porpoising and skidding in turns*;

releasable locking means mounted on one of the members directly interconnecting the members below the water line for operatively locking and unlocking the plate member relative to the mounting member in either of the positions thereof.

B1 4,236,923 (1138th)
METHOD OF METALLURGICALLY JOINING A FITTING TO A SHAFT

Akio Takahashi, Toyota; Chiaki Tsumuki, Aichi, and Hitoshi Nakamura, Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Aichi, Japan

Reexamination Request No. 90/000,572, Jun. 6, 1984.
Reexamination Certificate for Patent No. 4,236,923, issued Dec. 2, 1980, Ser. No. 960,622, Nov. 14, 1978.
Claims priority, application Japan, Jan. 31, 1978, 53-9527
Int. Cl.[4] B22F *7/00*
U.S. Cl. 419—6



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

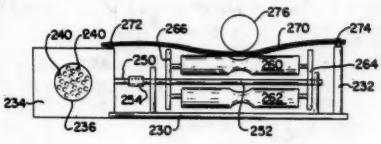
Claims 1–14 are cancelled.

[1. A method of joining a shaft to a fitting member comprising, molding a fitting member from wear-resistant iron base sinterable alloy powder which yields a liquid phase and shrinks during sintering; assembling said fitting member to a separately produced shaft; and then sintering the assembly of fitting member and shaft at a temperature to cause the fitting member to shrink and to yield a liquid phase of the fitting member to metallurgically bond the fitting member to the shaft.]

B1 4,506,660 (1139th)
MASSAGING DEVICE

William F. Curran, 85 Dobson Rd., Mars, Pa. 16046

Reexamination Request No. 90/001,523, Jun. 13, 1988.
Reexamination Certificate for Patent No. 4,506,660, issued Mar. 26, 1985, Ser. No. 360,791, Mar. 22, 1982.
and a continuation-in-part of Ser. No. 264,432, May 18, 1981, abandoned.
Int. Cl.[4] A61H *15/00*
U.S. Cl. 128—57



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim 14 is cancelled.

Claims 1, 13, 15 and 16 are determined to be patentable as amended.

Claims 2–12, dependent on an amended claim, are determined to be patentable.

13. *A cervical spine* [Massaging] *massaging* device comprising

a base portion,

a *cervical spine* [body] support portion for supporting only that portion of an [individual] *individual's cervical spine area* [body] which will receive massaging action,

a main drive shaft,

a motor means for rotating said main drive shaft,

said main drive shaft being rotatably mounted a fixed distance from said base portion,

a plurality of roller members operatively associated with said main drive shaft for orbital movement therearound in a fixed path with respect to said base portion responsive to rotation of said main drive shaft, whereby a stationary individual supported by said [body] *cervical spine* support portion with his or her cervical spine *area* [region] in overlying contacting *supported* relationship with respect to said roller members will receive continuous massaging action applied to said *area* [region] of the body,

said [body] *cervical spine* support portion having a flexible web in overlying position with respect to said roller members,

said flexible web being secured in fixed position with respect to said base portion, and

said flexible web being of such size and shape as to provide effective support to said cervical spine *area*, whereby said stationary individual will have said flexible web interposed between [the] *said* cervical spine *area* [region] and said roller members.

B1 4,659,369 (1140th)

HERBICIDAL ACETALS AND KETALS

George Levitt, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Reexamination Request No. 90/001,626, Oct. 27, 1988.

Reexamination Certificate for Patent No. 4,659,369, issued Apr. 21, 1987, Ser. No. 754,709, Jul. 16, 1985.

Continuation-in-part of Ser. No. 644,259, Aug. 27, 1984, abandoned.

Int. Cl.[4] **C07D** *239/69, 407/04;* **A01N** *43/54*

U.S. Cl. 71—92

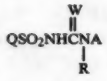
AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 2, 3, 18–30, 33, 34, 38–40, 42, 43, and 47–49 are cancelled.

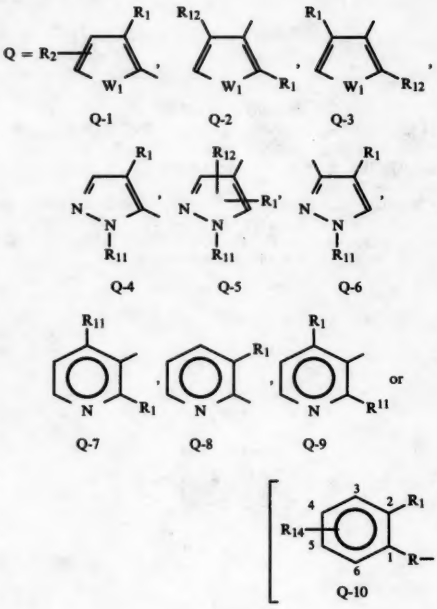
Claims 1, 4 and 6 are determined to be patentable as amended.

Claims 5, 7–17, 31, 32, 35–37, 41, and 44–46, dependent on an amended claim, are determined to be patentable.

1. A compound of the formula

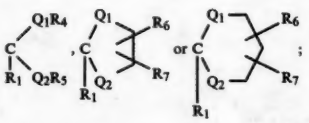


wherein



R is H or CH_3;

R_1 is



[E is CH_2 or a single bond;]

R_2 is H, C_1–C_2 alkyl or Cl;

R_3 is H, C_1–C_3 alkyl [or C_1–C_3 alkoxy];

R_4 and R_5 are independently C_1–C_2 alkyl;

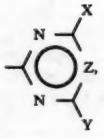
R_6 and R_7 are independently H or C_1–C_2 alkyl;

W is O or S;

W_1 is O or S;

Q_1 and Q_2 are independently O, S or NCH_3;

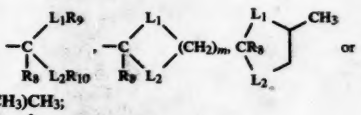
A is



X is H, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 haloalkoxy, C_1–C_4 haloalkyl, C_1–C_4 haloalkylthio, C_1–C_4 alkylthio, halogen, C_2–C_5 alkoxyalkoxy, amino, C_1–C_3 alkylamino or di(C_1–C_3-)alkylamino;

Y is H, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 haloalkoxy, C_1–C_4 haloalkylthio, C_1–C_4 alkylthio, halogen, C_2–C_5 alkoxyalkyl, C_2–C_5 alkoxyalkoxy, amino, C_1–C_3 alkylamino, di(C_1–C_3)alkylamino, C_3–C_4 alkenyloxy, C_3–C_4 alkynyloxy, C_2–C_5 alkylsulfinylalkyl, C_1–C_4 haloalkyl, C_2–C_5 alkylsulfonylal-

kyl, C_3–C_5 cycloalkyl, C_2–C_4 alkynyl, C_2–C_5 alkylthioalkyl, $C(O)R_8$,



or

$N(OCH_3)CH_3$;

m is 2 or 3;

L_1 and L_2 are independently O or S;

R_8 is H or CH_3;

R_9 and R_{10} are independently C_1–C_2 alkyl;

R_{11} is C_1–C_3 alkyl;

R_{12} is H, F, Cl, NO_2, C_1–C_2 alkyl, C_1–C_2 alkoxy, C_1–C_2 alkylthio, C_1–C_2 alkylsulfinyl, C_1–C_2 alkylsulfonyl, di(C_1–C_2)alkylsulfamoyl or CO_2(C_1–C_2alkyl);

R_{13} is H, C_1–C_2 alkyl, C_1–C_2 alkoxy, Cl, F or NO_2;

[R_{14} is H, C_1–C_3 alkyl, C_1–C_3 alkoxy, C_1–C_3 haloalalkyl, C_1–C_3 haloalkoxy, Cl, Br, F, NO_2, di(C_1–C_3)alkylsulfamoyl, C_1–C_3 alkylthio, C_1–C_3 alkylsulfinyl, C_1–C_3 alkylsulfonyl, amino, C_1–C_3 alkylamino, di(C_1–C_3)alkylamino, CH_2OCH_3, CH_2SCH_3 or CH_2CN;]

Z is CH;

and their agriculturally suitable salts, provided that

(a) when X is Cl, F, Br or I, then Y is OCH_3, OC_2H_5, $N(OCH_3)CH_3$, $NHCH_3$, $N(CH_3)_2$ or OCF_2H;

(b) when Y is cyclopropyl, X is other than Cl, F, Br or I;

[(c) when R_3 is C_1–C_3 alkoxy, then Q_1 and Q_2 are oxygen;]

[(d) when R_3 is H or C_1–C_3 alkyl, then Q is Q-1 through Q-9;]

(e) when the total number of carbon atoms of X and Y is greater than four, then the combined number of carbons of the substituents on Q is less than or equal to ten;

(f) when W is S, then [A is A-1;] R is H, and Y is CH_3, OCH_3, OC_2H_5, CH_2OCH_3, C_2H_5, CF_3, SCH_3, $OCH_2CH{=}CH_2$, $OCH_2C{\equiv}CH$, $OCH_2CH_2OCH_3$, $CH(OCH_3)_2$ or

[(g) when E is CH_2, then R_{14} is H, CH_3, OCH_3, Cl or NO_2 and is not in the 4-position.]

32. A composition suitable for controlling the growth of undesired vegetation which comprises an effective amount of a compound of claim 1 and at least one of the following: surfactant, solid or liquid inert diluent.

REISSUES

OCTOBER 10, 1989

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 33,082

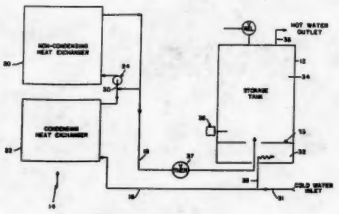
COMBUSTION PRODUCT CONDENSING WATER HEATER

Joseph Gerstmann, Framingham, and Andrew D. Vasilakis, Bedford, both of Mass., assignors to Advanced Mechanical Technology, Inc., Newton, Mass.

Original No. 4,403,572, dated Sep. 13, 1983, Ser. No. 150,289, May 16, 1980. Application for reissue Sep. 13, 1985, Ser. No. 775,661

Int. Cl.[4] F22B *33/00*

U.S. Cl. 122—20 B **50 Claims**



1. A method of heating water and storing the hot water in an insulated storage vessel comprising:

permitting natural stratification of the water within the vessel such that cooler water collects at the bottom of the vessel;

withdrawing cooler water from the bottom of the vessel and passing that water in heat exchange relationship with combustion gases from a burner assembly to cool those gases below their dew point temperature so as to extract some of the latent heat of vaporization from the gases and to heat the water;

returning the thus heated water to the storage vessel at a location in the storage vessel above the cooler water and in a manner as to avoid mixing with the cooler water, the volume of the cooler water below the location at which hot water is returned to the vessel being sufficiently large to provide for condensation of the combustion gases through substantially the entire heating cycle of the burner.

Re. 33,083

CONTROLLED DISPENSING APPARATUS

Raymond W. Pellegrino, 1650 Cardinal Dr., Coatesville, Pa. 19320

Original No. 4,569,463, dated Feb. 11, 1986, Ser. No. 578,811, Feb. 10, 1984. Application for reissue Feb. 9, 1988, Ser. No. 154,402

Int. Cl.[4] B67D *5/06;* **G01F** *11/26*

U.S. Cl. 222—181 **10 Claims**

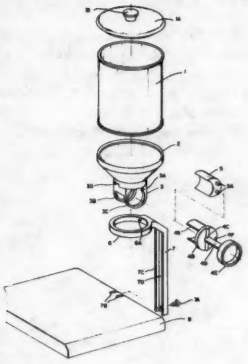
1. A measuring and dispensing apparatus for dispensing granular or liquid materials from a removable container, comprising:

a funnel-shaped member having a first end adapted sealingly and releasably to engage a container and a second end of smaller diameter than said first end having a dispensing head unitarily connected thereto;

said dispensing head comprising two rings extending in a direction opposite from said funnel-shaped member, a first of said rings being open at the center thereof and a second of said rings being closed at the center thereof;

a hollow cylindrical dispensing barrel having a closed end and an open end, said barrel being rotatably and removably supported within said rings such that said closed center of said second ring forms a closed end for said open end of said barrel;

a volumetric reduction means comprising a solid partially cylindrical member having an exterior surface corresponding in shape to an interior surface of said dispensing barrel and an interior surface which cooperates with said interior surface of said dispensing barrel to define therebetween a dispensing volume, said volumetric reduction means being removably secured within said dispensing barrel and removable through said open end of said dispensing barrel such that said dispensing volume can be



varied by placing within said dispensing barrel volumetric reduction means having differing interior surfaces; *and*

an opening on a longitudinal side of said barrel adjacent to said dispensing volume, such that when said opening is turned upwardly toward said container, some of said material within said container will fill said dispensing volume, and when said opening subsequently is turned downwardly, said material within said dispensing volume will be dispensed from said dispensing volume*[*; and

a yoke for releasably supporting said funnel-shaped member, said yoke in turn being supported by a longitudinally extending neck*]*.

Re. 33,084

INTERMITTENTLY OPERATING PNEUMATIC DEVICE FOR PUMPING SOLID-CARRYING LIQUIDS AND SLURRIES

Jean-Francois Ranson, 23 cite Leferrer, 62970 Courcelles-les-Lens, France

Original No. 46,842,95, dated Aug. 4, 1987, Ser. No. 797,644, Nov. 13, 1985. Application for reissue Sep. 21, 1988, Ser. No. 247,171

Int. Cl.[4] B65G *53/30*

U.S. Cl. 406—50 **7 Claims**

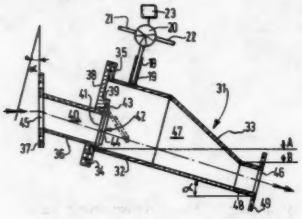
1. Intermittently operating pneumatic pumping device for a solid-carrying liquid or slurry and intended to be under a continuous load, and comprising:

a tubular body **(1,31)** defining an inner chamber with an entry port **(15,45)** and a delivery port **(16,46)** opening into the upstream and downstream ends, respectively, thereof;

at least one injection line for a compressed gas **(18)** opening into the inner chamber via at least one pressurization port **(19)**;

a supply valve (20) connected to each injection line (18) and intended to be connected to a source of compressed gas (21) to provide a selective supply of compressed gas to each injection line (18); and

a means of controlling (23) the supply valve (20); characterized in that the pumping device additionally comprises a single flap valve (12,42) mounted on a support (8,39) fixed inside the inner chamber, between the entry port and the pressurization port, and cooperating with a seat internal to the body, surrounding a passage port (11,41), for the solid-carrying liquid or slurry and defining, between it and the delivery port, a part of the inner chamber which constitutes a pumping chamber (17,47), the flap valve (12,42) pivoting, on [,] the one hand, towards the delivery port (16,46), in a position in which the pumping chamber is filling, in the absence of injection of compressed gas via the pressurization port (19) and under the pressure of the solid-carrying liquid or slurry which tends to enter the pumping chamber (17,47) through the passage port (11,41), and, on the other hand, in the opposite direction, towards the seat against which the valve (12,42) is applied in a leakproof manner in a position in which the pumping chamber (17,47) is closed upstream and is emptied downstream under the effect of an injection, via the pressurization port, of compressed gas which expels the volume of solid-carrying liquid held in the pumping chamber, out of



the latter, via the delivery port, the lowest point of the pumping chamber in the region of the flap valve seat being at a level which is at least as high as the level of the highest point of the pumping chamber in the region of the delivery port, the pumping chamber (47) is defined in the tubular body (31) which consists of an upstream part in the shape of a cylindrical shell (32), into which a single injection line (18) opens via a single pressurization port (19), and which is extended in the downstream direction by a funnel (33), having substantially the shape of the frustum of a cone offset downwards, the upstream end of the cylindrical shell (32) of the body (31) has a flange (34) for coupling to a flange (38) at the downstream end of a filling pipeline (36) which opens into the cylindrical shell (32) defining the entry port (41) into the body (31), the flap valve (42) being supported by the downstream flange (38) of the filling pipeline (36), [and the downstream end of the funnel (33) being extended in the downstream direction by a delivery pipeline (48) incorporating means for coupling (49) to a delivery line,] the tubular body having an upstream section (36) forming a filling chamber (40) and a downstream section (31) forming the pumping chamber (47) and with the flap valve opening in [the lowest part of] the upstream portion (32) of this downstream section (31) whereas the compressed gas injection line (18) opens in the upper part of said upstream portion (32) through port (19) in a direction substantially transverse to the direction of travel of the solid-carrying liquid or slurry.

Re. 33,085

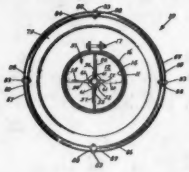
PRECLEANER

Ross K. Petersen, 449 Wildwood La., Burleson, Tex. 76028

Original No. 4,201,557, dated May 6, 1980, Ser. No. 954,226, Oct. 24, 1978. Continuation of Ser. No. 22,217, Mar. 5, 1987, abandoned, which is a continuation of Ser. No. 749,731, Dec. 13, 1976, abandoned, which is a continuation-in-part of Ser. No. 648,531, Jan. 12, 1976, abandoned. Application for reissue May 11, 1988, Ser. No. 193,238

Int. Cl.[4] B01D *50/00*

U.S. Cl. 55—327 **49 Claims**



14. An apparatus for separating particles from gas carrying the particles comprising: a housing having a separation chamber, said housing having a side wall surrounding said chamber and an adjacent gas and particle inlet opening, and a member disposed centrally of said chamber, vane means extending between [said] *and* connected to said side wall and said member, said vane means having a plurality of vanes, said vanes being generally similarly inclined and circumferentially spaced from each other forming passages so as to induce swirling motion of gas and particles in a circular direction passing therethrough whereby the particles move outwardly by centrifugal force, annular skirt means *having a substantially right cylindrical configuration, said skirt means being* attached to said side wall adjacent said separation chamber and spaced radially outwardly therefrom to define therein a discharge chamber radially outwardly of said separation chamber, an annular opening connecting the separation chamber and the discharge chamber, said housing including a wall attached to said skirt means extending inwardly therefrom in spaced relation thereto thereby to define discharge openings for gas and particles from said discharge chamber, a gas outlet sleeve disposed centrally of said wall extending inwardly from said skirt means and extending therethrough communicating with said separation chamber and defining a gas outlet passage therefrom, spinner means, means mounting said spinner means on the housing for free rotation in said separation chamber, said spinner means including propeller means adjacent said gas outlet passage whereby swirling gas in said separation chamber contacts said propeller means and solely effects rotation thereof, said spinner means further including outwardly extending arm means connected to said propeller means terminating in impeller paddles located in said discharge chamber, whereby rotation of said propeller means causes said paddles to rotate through said discharge chamber and force particles and [air] *gas* therefrom and through said discharge openings.

Re. 33,086

PROCESS FOR MANUFACTURING EFFERVESCENT GRANULES AND TABLETS AND HIGH EFFICIENCY GRANULATION TOWER FOR SUCH PROCESS

Jean Bru, 24 Rue Raphael, Paris 75016, France

Original No. 4,614,648, dated Sep. 30, 1986, Ser. No. 643,980, Dec. 20, 1983. Application for reissue Jul. 10, 1987, Ser. No. 71,991

Claims priority, application France, Dec. 21, 1982, 82-21476; Nov. 30, 1983, 83-19143

Int. Cl.[4] A61L *9/04;* **B01F** *3/12;* **C06D** *5/10;* **F26B** *17/12*

U.S. Cl. 424—44 **25 Claims**

10. A process for the manufacture of effervescent tablets from a plurality of powdered raw materials, with the avoidance of external contamination, said process comprising the steps of:

(a) storing said powdered raw materials in storage hoppers;

(b) transferring said raw materials downwardly by gravity to a granulator-vacuum-dryer device, introducing into said granulator-vacuum dryer device a granulation agent in an amount effective to wet form wet granules and drying under vacuum said wet granules therein to obtain dried granules;

(c) evacuating the dried granules by gravity from said granulator-vacuum dryer, transferring them downwardly by gravity to a cooler and cooling said dried granules to a temperature at which destabilization is impeded; and

(d) transferring said dried and cooled granules downwardly by gravity to a storage container;

said process being carried out in an enclosed vertically arranged apparatus array.

28. A vertically disposed apparatus array for the manufacture of effervescent tablets, said apparatus array constituting a tower and comprising in vertically descending order:

(a) storage hopper means positioned near the top of said tower for the storage of raw materials;

(b) granulation and vacuum drying means including means for introducing a granulation agent to wet form wet granules and means for eliminating humidity from said wet granules to obtain dried granules;

(c) cooling means for lowering the temperature of said dried granules, and

(d) at least one storage container for dried and cooled granules:

said apparatus comprising also means for feeding material by gravity from said storage hopper means to said granulation-vacuum drying means, means for evacuating said dried granules by gravity from said granulation-vacuum-drying means and feeding them by gravity to said cooling means, and means for transferring granules by gravity from said cooling means to said storage container or containers.

Re. 33,087

ELECTRIC POWER DISTRIBUTION AND LOAD TRANSFER SYSTEM

Michael P. Bradford, Orange; Gerald W. Parkinson, and Ross M. Grant, both of Shelton, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Original No. 4,638,175, dated Jan. 20, 1987, Ser. No. 627,706, Jul. 3, 1984. Application for reissue Jan. 20, 1988, Ser. No. 146,057

Int. Cl.[4] H02J *7/00*

U.S. Cl. 307—64 **20 Claims**

1. A power distribution system, comprising:

at least two switch means for controlling the application of power from a plurality of power sources [,] to a power output;

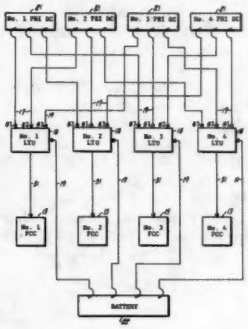
[at least two current means for preventing reverse power flow through respective ones of said plurality of switch means;] and

processing means for providing control signals to operate said switch means, effective to switch respective ones of said power sources between on and off states with respect to said power output;

characterized by:

first voltage [detection] *deriving* means for [detecting] *deriving first voltage signals dependent on* the levels of first voltages at a first side of corresponding ones of said switch means;

first comparator means for comparing the [voltages detected] *first voltage signals derived* by said first voltage [detection] *deriving* means to selected upper and lower voltage thresholds and for providing a signal indication of an abnormal voltage condition to said processing means



when any of said first [detected voltages are] *voltage signals is* at a level not within the bounds of said upper and lower voltage thresholds, said processing means responding to said abnormal signal [indicator] *indication* such that *the* power sources are selectively switched *off* with respect to said power output in view of any abnormal voltage conditions.

Re. 33,088

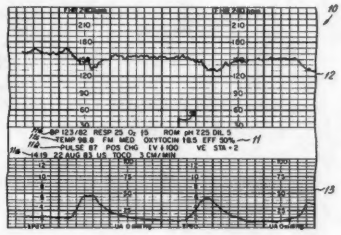
METHOD AND APPARATUS FOR RECORDING MEDICAL INFORMATION ON A STRIP CHART

Flave L. Jones, Guilford, and Mark L. Kelly, Middletown, both of Conn., assignors to American Home Products Corporation, New York, N.Y.

Original No. 4,513,295, dated Apr. 23, 1985, Ser. No. 544,325, Oct. 21, 1983. Application for reissue Jul. 23, 1986, Ser. No. 889,319

Int. Cl.[4] G01D *9/00;* **A61B** *5/04*

U.S. Cl. 346—1.1 **33 Claims**



1. [For] *In a fetal monitoring device including* printing by a strip chart recorder and displaying by a display device medical information, a method comprising:

communicating said medical information to switching membrane means *in a remote control device while held in the hand of a user located remote from said recorder and display device;*

scanning said switching membrane means;

generating one of a plurality of membrane signals in response to each communication and scan;

identifying said one of said plurality of membrane signals;

displaying by said display device said medical information in response to said identification; and

either printing by said recorder said medical information in response to said identification *or cancelling said medical information in favor of communicating either corrective or new medical information to said switching membrane means, after said medical information has been displayed.*

Re. 33,089

POSITION SENSING AND INDICATING DEVICE

Robert B. Pepper, 55140 Calhoun St., Thermal, Calif. 92274, and James A. Maples, 762 Allen Ct., Palo Alto, Calif. 94303

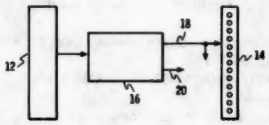
Original No. 4,514,817, dated Apr. 30, 1985, Ser. No. 233,000, Feb. 10, 1981. Continuation-in-part of Ser. No. 18,411, Mar. 7, 1979, Pat. No. 4,270,171. Application for reissue Apr. 24, 1987, Ser. No. 42,351

Int. Cl.[4] G06F *15/20;* H05B *39/04*

U.S. Cl. 364—480 27 Claims

1. A [level] controlling device comprising:

position sensing transducer means having an elongated transducing surface for detecting the presence and position of an actuating device that is arbitrarily positionable by a user on the transducing surface independent of any previous position of the actuating device on the transducing surface, said detection being independent of the electrical properties of the human body; and



circuit means connected to the transducer means for producing a fist signal representative of the fact that an actuating device is present at the transducing surface and a second signal representative of the position of the actuating device at the transducing surface for controlling [the level of] a utilization device.

PLANT PATENTS

GRANTED OCTOBER 10, 1989

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,045

APRICOT TREE PA 7201-1

Thomas K. Toyama, Prosser, Wash., assignor to Washington State University Research Foundation, Pullman, Wash.

Filed Jul. 21, 1988, Ser. No. 222,576

Int. Cl.[4] A01H *5/02*

U.S. Cl. Plt.—39 1 Claim

1. A new and distinct variety of apricot tree obtained as a seedling from a seed parent entitled Goldrich (unpatented) and a pollen parent entitled Blenril (unpatented) is characterized by its large to very large firm attractive fruits of excellent quality and flavor which are especially well adapted for shipment to fresh markets because of its firmness, long shelf life and excellent dessert quality, substantially as shown and described.

7,046

HOSTA PLANT SOLAR FLARE

Henry A. Ross, 16711 Pearl Rd., Strongsville, Ohio 44136

Filed Nov. 25, 1988, Ser. No. 276,423

Int. Cl.[4] A01H *5/00*

U.S. Cl. Plt.—68 1 Claim

1. A new and distinct variety of Hosta, substantially as described and illustrated; named Hosta 'Solar Flare'; particularly distinguished by its extreme large size and size of foliage in which the color ranges from golden-green to golden-yellow with bright green midrib and veins developing on the upper surface toward the end of the growing season.

PATENTS

GRANTED OCT. 10, 1989

ERRATA

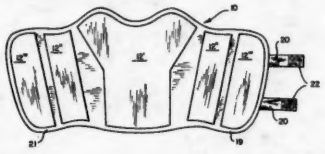
For CLASS	See PATENT NO.
165-167	4,872,578
128-205	4,872,579
211-045	4,872,580
212-180	4,872,581
374-005	4,872,762
136-244	4,872,925
428-209	4,873,022
562-091	4,873,025
562-072	4,873,026
562-083	4,873,027
428-036	4,873,116
436-176	4,873,193
427-365	4,873,303
528-487	4,873,314
570-130	4,873,315
514-303	4,873,334
548-157	4,873,346
568-319	4,873,363
568-344	4,873,364
568-345	4,873,365
388-814	4,873,473
346-140	4,873,622
065-374	4,873,674
370-058	4,873,694
371-021	4,873,705
328-062	4,873,708

PATENTS

GRANTED OCTOBER 10, 1989

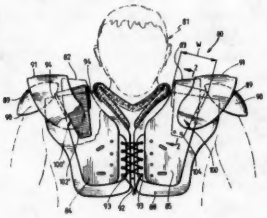
GENERAL AND MECHANICAL

4,872,215
CHEST PROTECTOR
Willamena Sliger, P.O. Box 52, Idamay, W. Va. 26576
Filed Feb. 22, 1988, Ser. No. 158,857
Int. Cl.[4] A41D *13/00*
U.S. Cl. 2—2 **7 Claims**



1. A protector for use in sporting activities sized to cover the chest and abdomen of a user comprising a first protective member, said first protective member comprising an outer layer formed of one of leather or light-weight leather-like material and an inner layer formed of batting, at least two laterally spaced apart pieces of a closed-cell foam provided intermediate said outer layer and said inner layer, each of said pieces of foam sized and positioned to cover a selected different vulnerable portion of the chest and abdomen regions to provide additional protection to those selected different vulnerable portions, and means to secure the protector around the chest and abdomen.

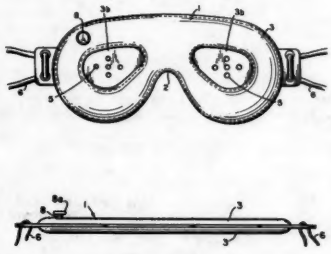
4,872,216
CANTILEVER STRAP FOR FOOTBALL SHOULDER PADS
James C. Wingo, Jr., Houston, Tex., assignor to Riddell, Inc., Chicago, Ill.
Filed May 13, 1988, Ser. No. 193,840
Int. Cl.[4] A41D *13/00*
U.S. Cl. 2—2 **7 Claims**



1. In a shoulder pad for a football player, the shoulder pad having body arch members, which include depending chest and back portions; a pad body disposed beneath the body arch members; and cantilever straps secured to the body arch members to support the body arch members in a spaced relationship from the pad body, the cantilever straps each including a central portion thereof which overlies the acromioclavicular area of the football player's shoulder, the improvement comprising:

the central portion of each cantilever strap which overlies the acromioclavicular area of the football player's shoulder, is substantially greater in width than two inches, whereby the force from an impact upon a body arch member is transmitted to the acromioclavicular area of the football player's shoulder by the cantilever strap, and the force is dispersed over the area of the central portion of the cantilever strap which overlies the acromioclavicular area of the football player's shoulder.

4,872,217
EYE MASK
Hidehiro Kitayama, 2-22-11, Yanagibashi, Tokyo, Japan
Filed Mar. 11, 1988, Ser. No. 167,161
Claims priority, application Japan, Mar. 20, 1987, 62-39928
Int. Cl.[4] A61F *9/04*
U.S. Cl. 2—15 **1 Claim**



1. An eye mask for placement on the human face for sleeping purposes comprising the combination of:

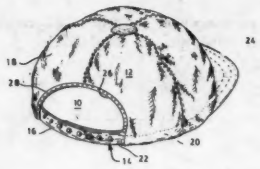
first and second air impermeable sheet members sealed along the periphery thereof and adapted to form an air chamber therebetween; valve means communicating said chamber to the exterior of said eye mask, whereby air may be introduced into said chamber, said air impermeable sheet members having a mask configuration and spaced non-air inflated chamber portions corresponding in size and location to the eyes on a human face and having a plurality of apertures in each of said portions; and means on either side of said mask for attachment to the human face of a wearer of said eye mask.

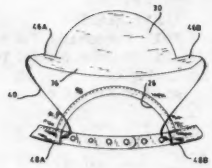
4,872,218
CAP ATTACHMENT TO PREVENT PROTRUDING HAIR
George G. Holt, P.O. Box 3244, Morristown, Tenn. 37814
Filed Feb. 29, 1988, Ser. No. 161,747
Int. Cl.[4] A42B *1/22, 1/24*
U.S. Cl. 2—171.5 **7 Claims**

1. An attachment for a conventional baseball-type cap having a size adjustment strap secured at its opposite ends to the lower border of the head cover proximate a head band, and having an opening in the back of the headcover between the head cover and the size adjustment strap, comprising:

an attachment member dimensioned for covering said opening; and

securing means for releasably mounting said attachment member on said cap such that said attachment member





covers said opening and prevents hair from protruding through said opening when said cap is worn.

4,872,219
SELF-SUPPORTING EAR PROTECTOR
Karen Duncan, 15 Palmer St., Cos Cob, Conn. 06870
Filed May 2, 1988, Ser. No. 189,384
The portion of the term of this patent subsequent to Dec. 22, 2004, has been disclaimed.
Int. Cl.[4] A61F *11/00*; A42B *1/06*
U.S. Cl. 2—209 **7 Claims**

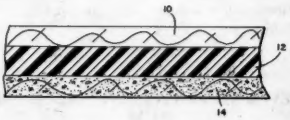
1. An ear protector comprising:

a flexible core member having a ring shape and formed of a unitary resilient, flexible plastic material substantially impervious to cold weather conditions and having substantially constant thickness, said core having a general configuration of an ear to be protected, said continuous loop defining a first central opening therein;

an outer protective exposed layer of material secured to one side of said sheet of plastic material in covering relation to said first central opening; and

an inner layer secured to an opposite side of said sheet of plastic material and having a second central opening in substantial alighment with said first central opening.

4,872,220
PROTECTIVE COMPOSITE MATERIALS, THEIR PRODUCTION AND ARTICLES OF PROTECTIVE CLOTHING MADE THEREFROM
Yair Haruvy, Rehovot; Moshe Katz, Rishon Le-Zion, and Abraham A. Horowitz, Rehovot, all of Israel, assignors to The State of Israel, Atomic Energy Commission, Soreq Nuclear Research Center, Yavne, Israel
Filed Aug. 26, 1987, Ser. No. 89,953
Claims priority, application Israel, Sep. 5, 1986, 79955
Int. Cl.[4] A41D *3/04*
U.S. Cl. 2—243 A **20 Claims**

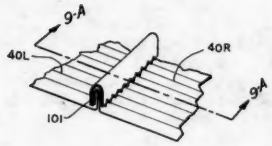


17. A flexible protective composite material, comprising an air and water permeable outer fabric ply, a substantially continuous and essentially non-porous and non-foamed synthetic polymeric film having a water permeation rate of less than 300 $g/m^2/h$ as an intermediary ply, and an air and water permeable fabric inner ply bearing an adsorbent substance capable of interaction with noxious materials by either of adsorption and chemical reaction.

4,872,221
REENFORCED PANT STRUCTURE
Eugene E. Stone, III, 1500 Poinsett Highway, Greenville, S.C. 29608
Continuation of Ser. No. 06,857,648, Apr. 29, 1986, abandoned. This application Nov. 23, 1987, Ser. No. 125,803
Int. Cl.[4] A41B *9/02*; A41D *27/24*
U.S. Cl. 2—404 **2 Claims**

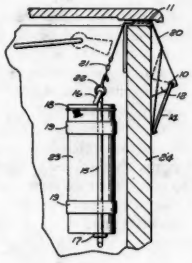
1. In a pant undergarment including leg portions having two front panels connected to each other to form a fly and crotch and connected to a back panel to form inseams along said leg portions, the improvement comprising forming said crotch by doubly folding over to the same side intersecting and aligned edge portions of said front panels together beneath the inside of the fly, said edge portions co-terminating to form a four ply fold extending from said fly to said inseams, a reinforcing strip

of fabric folded over and surrounding both sides of said fold for the full length of said fold, and zigzag stitching extending



through said reenforcing fabric and said fold for the full length of said fold.

4,872,222
TOILET-TANK LEAK DETECTOR, CHEMICAL ECONOMIZER
Jonn P. Pavlik, 20411 Lassen St., Chatsworth, Calif. 91311
Filed Jul. 27, 1988, Ser. No. 225,461
Int. Cl.[4] E03D *9/02*
U.S. Cl. 4—228 **9 Claims**



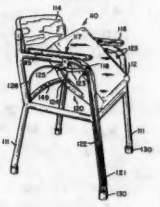
1. A device for colorimetric detection of a leak past a toilet-tank flush valve and overflow pipe within a toilet flush tank having a lid and an upper rim above a water level and for economizing the dispensing of toilet-bowl cleansing chemicals comprising:

a flexible line having first and second ends

means for attaching a source of water coloring toilet bowl cleanser to the first end of said line;

means for slidably mounting said line across said rim of a toilet flush tank such that said first end is disposed within said tank and said second end is disposed exterior to said tank and means associated with said second end for holding said line stationary at a first level whereby said source of water coloring toilet bowl cleanser is above the water level in the tank, and a second level whereby said source of water coloring toilet bowl cleanser is below the water level in the tank without lifting the tank lid.

4,872,223
ORTHOPEDIC CHAIR
Lincoln F. Baird, 3482 Moore St., Los Angeles, Calif. 90066
Filed Sep. 26, 1985, Ser. No. 781,134
Int. Cl.[4] A47K *3/10*
U.S. Cl. 4—480 **2 Claims**



1. An orthopedic chair comprising:

a. a frame;

b. a seat which is pivotally coupled to said frame at the front thereof;

c. a back which is mechanically coupled to said frame;

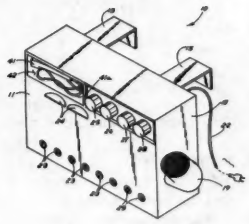
d. a pair arm-rests which are mechanically coupled to said frame;

e. a pair of rubber tubes each of which has a first end which is mechanically coupled to the base of said frame;

f. a pair of pulley systems, each of which includes two pulleys which are disposed in series and mechanically coupled to said frame above said seat and through each of which the second end of one of said rubber tubes is threaded and wherein the second end of said rubber tube securably coupled to said seat whereby said rubber tubes resiliently bias said seat, when it is in its first position, towards its second position so that said seat may be used to assist an invalid to easily sit therein or to rise therefrom; and

h. releasing means for releasing said seat so that said rubber tubes moves said seat from its first position to its second position.

4,872,224
BATHTUB APPARATUS
Fred D. Grimes, and Linda D. Grimes, both of 885 Fairview Ave., SE., Salem, Oreg. 97302
Filed Feb. 16, 1988, Ser. No. 156,414
Int. Cl.[4] A61H *33/00*
U.S. Cl. 4—544 **6 Claims**



1. A bathtub apparatus for use in combination with a bathtub container including top and bottom walls, right and left end walls, a rear wall, and a forward wall to define a module, said apparatus comprises,

a securement means adjustably extending outwardly from said rear wall for securement of said module to an encircling wall of said bathtub;

a fluid inlet conduit means secured to said right wall directed inwardly of said module to an inlet pipe;

said inlet pipe in contiguous position proximate a selectively operative heating means for heating fluid directed through said inlet pipe;

a selectively operative pump means positioned to accept water from said inlet pipe for directing water under pressure to an outlet pipe within said module;

a discharge conduit operatably connected to said outlet pipe to direct fluid outwardly of said module into said bathtub container;

said securement means includes a plurality of "L" shaped brackets telescopingly directed from said rear wall and formed with teeth cooperative with housing teeth formed within said module to adjustably position said bracket relative to said module;

said inlet conduit means is directed to said inlet pipe by a reducer to reduce the cross-sectional area of flow from said inlet conduit means to said inlet pipe;

said inlet pipe includes a serpentine coil operatably associated with said heating means to effectively heat fluid within said serpentine pipe, and

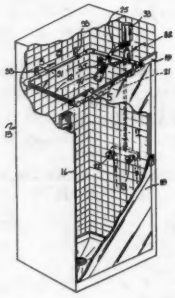
including a first valve means positioned between said pump means and said discharge conduit selectively operative to direct water to said discharge conduit or to a plurality of adjustably orientable water jets operatably associated with said first valve through an elongate water manifold wherein said water jets are positioned proximate a lower edge of said forward wall.

4,872,225

CLEANING APPARATUS AND METHOD FOR BATH ENCLOSURES

John C. Wagner, 4505 S. Yosemite, #379, Denver, Colo. 80237

Filed Sep. 6, 1988, Ser. No. 240,209
Int. Cl.[4] A47K *4/00*
U.S. Cl. 4—662 **20 Claims**



1. A cleaning device for a bath enclosure that is usable in combination with a shower head and a water supply pipe comprising:

spray means for mounting in an upper portion of a bath enclosure, said spray means including a spray pipe shaped to extend along the inside surface of a bath enclosure, said spray pipe having a plurality of discharge opening selectively located at spaced intervals along an outer side of the pipe, each said discharge opening being substantially the same distance from the inside surface of the bath enclosure and arranged for directing and spraying a liquid stream at a downward angle in an overlapping pattern against substantially the entire inside surface of at least one wall of said bath enclosure,

water flow control and support means arranged for supporting and supplying water to a shower head to spray inside the bath enclosure and supporting and in the alternative supplying water to said spray means, and

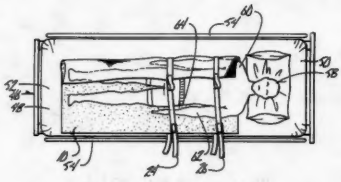
fluid injection means for introducing a cleaning fluid into the water flowing from a water supply pipe to said spray means to provide a cleaning liquid that is sprayed by said spray means against said inside surface and flows down along an inside surface area of said wall to clean substantially all of said inside surface area.

4,872,226

MEANS FOR POSITIONING BEDFAST PATIENTS

Robert Lonardo, 680 Capri Blvd., Treasure Island, Fla. 33706, assignor to Robert Lonardo, Treasure Island, Fla.

Filed Jun. 6, 1988, Ser. No. 202,532
Int. Cl.[4] A61G *7/10*
U.S. Cl. 5—61 **1 Claim**



1. A bedfast patient positioning device, comprising,

a substantially rectangular pad means adapted to extend over a patient's bed underneath a bedfast patient, said pad means having opposite parallel sides, and upper and lower surfaces,

a pair of separate continuous straps secured to the bottom surface of said pad means and extending transversely across the width of said pad means and extending outwardly from said opposite parallel side thereof, and terminating in straight elongated portions,

said pair of continuous straps being spaced apart and one each thereof being adapted to be substantially aligned with a patient's shoulder and hip areas, respectively, and

a pair of gripping loops secured to said pair of straps substantially adjacent the opposite parallel sides of said pad means inwardly from the ends thereof;

the device further including buckle elements that are slidably mounted on said strap elements to selectively adjust the effective lengths thereof, and open hook elements being secured to said buckle elements and being adapted for securement to a side rail of a patient's bed to maintain the straps in a predetermined position with respect to the patient.

4,872,227

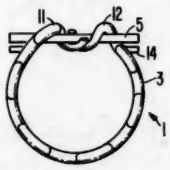
STIFFENING MODULE FOR A MATTRESS BOX SPRING AND A BOX SPRING INCORPORATING SAME

Michael H. Galumbeck, 5577 Vantage Point Rd., Columbia, Md. 21044

Filed Jan. 5, 1988, Ser. No. 141,081
Int. Cl.[4] A47C *23/057*
U.S. Cl. 5—246 **19 Claims**

1. A stiffening spring module for a spring unit having a wire frame which includes a plurality of spaced wire grid members comprising stiffening means having a spring formed by a sinuously-shaped length of spring wire terminating at opposite ends in first and second substantially "S" shaped end sections respectively, each said end section including a terminal leg having a free end, an intermediate leg spaced from said terminal leg and an inner leg spaced from said intermediate leg, said intermediate leg being joined to said terminal and inner legs to form undulations having two adjacent loops with a first loop between said intermediate and terminal legs and a second loop

between said intermediate and inner legs, and attachment means for attaching the stiffening means to said wire frame and being locked into engagement with said stiffening means by a spring action of the spring thereof, said attachment means including an elongate member having first and second ends which is dimensioned to extend through at least the first loops



of said first and second end sections, said elongate member having engagement means formed intermediate the first and second ends thereof to engage the terminal legs of said first and second end sections to form a loop from said length of spring wire, the spring action of said stiffening means operating to hold said terminal legs in engagement with said engagement means.

4,872,228

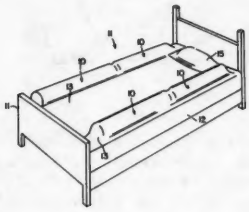
BED GUARD

Carolyn B. Bishop, 1960 Dembrigh La., Charlotte, N.C. 28213

Filed Jun. 27, 1988, Ser. No. 212,605

Int. Cl.[4] A47C *21/08*

U.S. Cl. 5—425 **4 Claims**



1. In a bed having a mattress with a continuous and uninterrupted planar upper surface and a bedsheet with a continuous and uninterrupted planar upper surface covering the mattress and tucked under the mattress, the improvement which comprises the combination of means for reducing the risk of a person falling out of bed without

interrupting the continuous and uninterrupted planar upper surface of the mattress or the bedsheet, said means comprising at least one separate bolster unconnected to the mattress or the bedsheet and operatively positioned on top of the mattress and extending at least partially along one side of the mattress and under the bedsheet which covers the mattress and is tucked under the mattress, whereby the bolster is frictionally held in operative position between the mattress and the bedsheet.

4,872,229

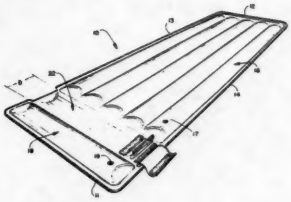
WATERPROOF INFLATABLE MASSAGE AIR MATTRESS

Antonio Brady, 2401 Beta St., San Diego, Calif. 92112

Continuation-in-part of Ser. No. 38,997, Feb. 13, 1987, which is a continuation-in-part of Ser. No. 887,533, Jul. 21, 1986, abandoned, which is a continuation-in-part of Ser. No. 887,730, Jul. 21, 1986, abandoned, which is a continuation-in-part of Ser. No. 788,825, Oct. 18, 1985, abandoned. This application Apr. 4, 1988, Ser. No. 177,314

Int. Cl.[4] A47C *27/10*; A61G *7/04*

U.S. Cl. 5—455 **6 Claims**



1. A waterproof inflatable massage air mattress comprising:

an elongated air mattress having a longitudinal axis, said air mattress having a top surface, a front end, a rear end and spaced lateral edges;

a transversely extending inflatable head cushion portion located adjacent the front end of said air mattress;

a longitudinally extending inflatable body cushion portion whose one end is located adjacent the rear end of said air mattress and whose other end is spaced a predetermined distance from said head cushion portion;

a vibrator assembly chamber formed in said air mattress intermediate said inflatable body cushion portion and said inflatable head cushion portion, said chamber having a closed rear end and a front end that is open and has means for opening and closing it that are water impermeable; and

a vibrator assembly that may be inserted into or removed from said vibrator assembly chamber.

4,872,230

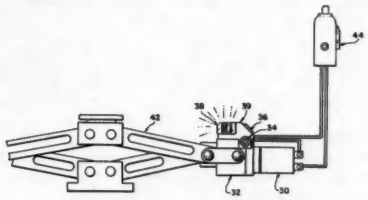
ELECTRICALLY POWERED AUTOMOBILE JACK AND NUT REMOVER

Anthony Levine, 5000 Brewster Dr., Tarzana, Calif. 91356

Filed Apr. 25, 1988, Ser. No. 185,892

Int. Cl.[4] B25F *3/00*

U.S. Cl. 7—100 **15 Claims**



1. An electrically powered automobile tire-changing apparatus, comprising:

a first D.C. electric motor, and means for providing power to said motor including a cigarette-lighter type plug for plugging into an automobile cigarette lighter outlet;

a jack for lifting the wheel of an automobile off the ground to enable the changing of a tire;

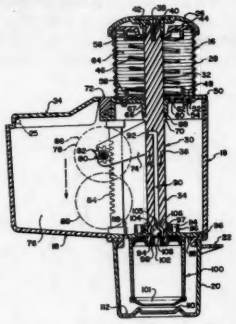
a nut remover for removing nuts from a wheel to permit removal of a wheel from an automobile and for reapplying and tightening nuts for replacement of a wheel to the automobile;

4,872,231
IMPACT BLADE TOOL
Willard Gustavsen, P.O. Box 37, Berrien Springs, Mich. 49103
Filed Jul. 19, 1988, Ser. No. 222,688
Int. Cl.[4] B25F *1/00*
U.S. Cl. 7—103 **15 Claims**

1. A carpet tucking tool, comprising:
(a) a blade member having a guide portion at one end and a carpet gripping edge adjacent its opposite end;
(b) a handle having substantial mass including a guide portion telescopically mounted on said blade member guide portion;
(c) spring means resiliently biasing said handle guide portion telescopically away from said blade member guide portion;
(d) stop means limiting relative telescopic movement of said guide portions of said handle and blade member, retaining said handle guide portion on said blade member guide portion;
(e) said blade member and handle having mating impact driving surfaces whereby said handle functions as an impact driver driving said gripping edge upon impact of said driving surfaces; and
(f) means preventing relative rotation of said handle and said blade during telescopic movement thereof; and
said handle includes a generally cylindrical transverse solid gripping portion, said means preventing relative rotation being fixed to said gripping portion for selective engagement with said blade guide portion.

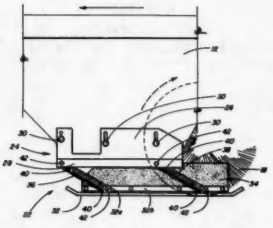
4,872,232
PORTABLE GOLF CLUB HEAD CLEANER
Janos G. Stiasny, Vancouver, Canada, assignor to Club Mate Products Inc., Vancouver, Canada
Filed Oct. 14, 1988, Ser. No. 257,934
Int. Cl.[4] A63B *57/00*; A46B *13/08*
U.S. Cl. 15—21 E **16 Claims**

1. A portable golf club head cleaner, comprising:
(a) a body having a location for receiving a golf club head and a reservoir for holding a liquid;
(b) a brush for cleaning a golf club head when adjacent the brush;
(c) means for moveably mounting the brush within the body, adjacent said location;
(d) pumping means for pumping liquid from the reservoir onto the brush; and



(e) manually operable means for simultaneously pumping the pumping means to pump liquid onto the brush and for moving the brush to clean a golf club head at said location.

4,872,233
STREET SWEEPER WITH COOL SPRINGS SUPPORTED DRAG SHOE
Stanley M. Brown, Wake Forest, N.C., assignor to Athey Products Corp., Raleigh, N.C.
Filed Nov. 28, 1988, Ser. No. 276,653
Int. Cl.[4] E01H *1/04*
U.S. Cl. 15—83 **8 Claims**



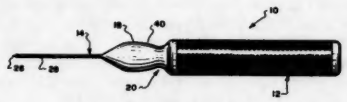
1. In a street sweeper having a drag shoe assembly disposed outwardly of and adjacent to each side of a rotating brush for generally confining dirt debris, etc., inwardly of the drag shoe assembly as the brush is rotated and wherein each drag shoe assembly includes an upper frame member secured to the street sweeper and a drag shoe moveably mounted to the upper frame member, the improvement comprising a linkage arrangement for interconnecting the drag shoe with the upper frame member such that the drag shoe may (1) move vertically up and down with respect to the upper frame member as the street sweeper moves over uneven surfaces and (2) move laterally back and forth in response to the drag shoe engaging obstructions when the street sweeper is turning or otherwise moving laterally, the improved drag shoe linkage comprising a pair of coil springs interconnected between the upper frame member and the drag shoe; the coil springs being disposed in parallel relationship and having opposite ends pivotally mounted to the upper frame member and drag shoe; and wherein the coil springs may flex laterally back and forth in response to the drag shoe engaging a lateral obstruction and wherein the coil springs act to return the drag shoe to a normal vertical orientation once the drag shoe has cleared the lateral obstruction.

4,872,234

WATER SPRINKLER HEAD CLEANING TOOL

Gary C. Wonnacott, 6237 Bonsall Dr., Malibu, Calif. 90265

Filed Jul. 5, 1988, Ser. No. 215,368
Int. Cl.[4] B05C 15/02; B08B 9/02
U.S. Cl. 15—104.16 30 Claims



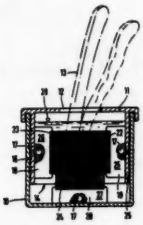
1. A water sprinkler head cleaning tool, comprising:
(a) an elongated handle having a forward end; and
(b) an elongated thin metallic needle-like debris-unclogging shaft having forward and rearward end portions;
(c) said handle including a mounting tip disposed at said handle forward end, said mounting tip having a diameter smaller than that of the remainder of said handle and a tapered low profile, said shaft being embedded at its rearward end portion in said mounting tip and projecting forwardly therefrom;
(d) said mounting tip having rearward and forward oppositely-tapered axial sections and a middle section located between and interconnecting said rearward and forward sections and defining the maximum diameter of said mounting tip, said rearward and forward sections extending in opposite rearward and forward directions from said middle section, said forward tapered section providing a low profile configuration for allowing said mounting tip to be placed close to an orifice of the water sprinkler head and said rearward tapered section being connected to said handle forward end and providing an axial region on said tip for secure attachment of a water spray deflecting shroud thereto rearwardly of said maximum diameter middle section of said mounting tip.

4,872,235

APPARATUS FOR CLEANING MEDICAL HAND INSTRUMENTS AND IMPLEMENTS FOR TREATMENT OF THE HAIR, SKIN AND/OR BODY

Ernst P. F. Nielsen, Berliner Str. 24, D-6090, Ruesselsheim, Fed. Rep. of Germany

Filed Feb. 4, 1988, Ser. No. 152,106
Claims priority, application Fed. Rep. of Germany, Feb. 12, 1987, 8702105; Apr. 25, 1987, 8706008
Int. Cl.[4] A46B 17/06
U.S. Cl. 15—104.92 17 Claims



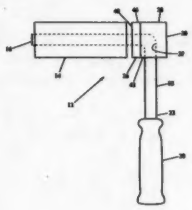
1. An apparatus for cleaning medical hand instruments and implements for treating hair, skin and/or body comprising:
(a) a container having opposed parallel side wall means and bottom wall means orthogonal to said side wall means;
(b) a plurality of cleaning means including at least a first cleaning means detachably affixed to said bottom wall means and a second cleaning means detachably affixed to and extending along one of said side wall means adjacent and parallel to said first cleaning means such that cleaning surface portions of said first and second cleaning means contact each other and at least partially overlap; and
(c) a solution in said container totally immersing said cleaning means.

4,872,236

CORNER PAINTING ATTACHMENT FOR PAINT ROLLERS

Marshall A. Thompson, 1253 N. Modesto, Camarillo, Calif. 93010

Filed Jun. 24, 1988, Ser. No. 210,246
Int. Cl.[4] B05C 17/00
U.S. Cl. 15—118 7 Claims



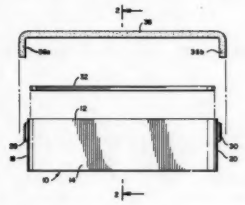
1. A corner painting attachment for use with a paint roller having a generally cylindrical roller and a generally L-shaped handle with said roller rotatably mounted on one leg of said handle and the other leg of said handle extending substantially perpendicular to the axis of said roller, said attachment comprising:
a base portion formed to releasably mount on the handle of said paint roller adjacent the bend of said handle and formed with a tapered upper portion having sides inclining toward each other and joining in a line extending parallel to said other leg of said handle.

4,872,237

CHALK DUST REMOVER

Lloyd J. Smith, 1601 E. Jackson, Lot #30, Macomb, Ill. 61455

Filed Nov. 25, 1985, Ser. No. 802,319
Int. Cl.[4] A47L 25/00
U.S. Cl. 15—210 R 5 Claims



1. A device for removing accumulated chalk dust from a cleaning surface of a chalkboard cleaner comprising:
(a) a housing having an exterior surface and defining a receiving chamber having an open side for receiving chalk dust from the chalkboard cleaner;
(b) a support member releasably mounted on the housing so as to extend across the open side of the receiving chamber, the support member defining a plurality of holes extending therethrough in communication with the receiving chamber to allow passage of chalk dust through the support member into the receiving chamber;

(c) means for removing chalk dust from the chalkboard cleaner comprising a sheet of porous, open cell foam material having downwardly turned end portions, the sheet extending over the support member and defining an exposed, rough surface adapted to contact the cleaning surface of the chalkboard cleaner such that relative sliding contact between the exposed rough surface of the sheet and the cleaning surface of the chalkboard cleaner removes accumulated chalk dust therefrom whereby the open cells of the foam material allow the removed chalk dust to pass therethrough into the openings of the support member; and

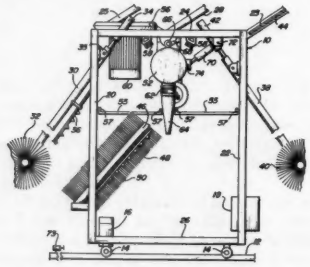
(d) attachment means located on the exterior surface of the housing so as to removably attach said opposite end portions of the sheet of foam material to the housing.

4,872,238

VEHICLE TREATMENT APPARATUS

Lonnie Crotts, Summerfield, and Thomas W. Meadows, Providence, both of N.C., assignors to Bivens Winchester Corporation, Danville, Va.

Filed Sep. 21, 1987, Ser. No. 98,952
Int. Cl.[4] B60S *3/04*
U.S. Cl. 15—302 **25 Claims**



1. Apparatus for drying a washed vehicle in a vehicle drying location comprising:

an elongate air plenum;

support means disposing said plenum transversely across and over said vehicle drying location;

a plurality of conical, fabric-like, flexible air outlet nozzles connected to and receiving air from said plenum and emitting said air downwardly against the surface of a wet vehicle in said location, said nozzles extending said vehicle; and

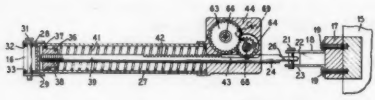
means carried by said support means for supplying air to said plenum.

4,872,239

DOOR CLOSURE WITH MECHANICAL BRAKING MEANS

Edward H. Ferguson, Arlington Heights, and Kiyoshi Iha, Elk Grove Village, both of Ill., assignors to The Chamberlain Group, Inc., Elmhurst, Ill.

Filed Aug. 10, 1988, Ser. No. 230,433
Int. Cl.[4] E05F *1/10, 5/02*
U.S. Cl. 16—64 **6 Claims**



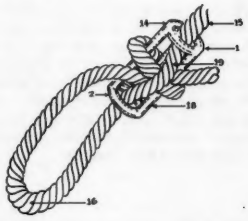
1. A door closure mechanism for a pivoted door which pivots about a pivot point comprising, a longitudinal rack member with one end pivotally attached to a door jam adjacent the said pivot point of said door and formed with a rack, a housing into which said rack member extends, said housing pivotally attached to said door at a point remote from said pivot point of said door, first spring means mounted in said housing and urging said rack member into said housing to bias said door toward the closed position, a pinion gear rotatably mounted in said housing and engageable with said rack, brake means coupled to said pinion gear, wherein said brake means includes a second gear rotatably supported by said housing and in mesh with said pinion gear, and wherein said pinion gear is loosely mounted in said housing for movement into and out of engagement with said rack and a second spring which engages said pinion gear so as to bias it into engagement with said rack.

4,872,240

STEEL KNOT FOR ROPES

Raphael F. Spinner, Hillsboro, Ill.; Clement F. Marley, R.R. 2 Box 165, Nokomis, Ill. 62075; Mary Brown (executrix of said Raphael F. Spinner, deceased), and Cathy Grant (executrix of said Raphael F. Spinner, deceased), assignors to Clement F. Marley, Noromis, Ill.

Filed Oct. 26, 1987, Ser. No. 113,468
Int. Cl.[4] F15G *11/00*
U.S. Cl. 16—114 B **1 Claim**



1. A device for tying a rope or a cable to a load comprising; two round end rings of equal diameter and two or more rounded and unevenly spaced parallel bars of equal length, one end of each bar is connected to the first ring and the other end of each bar is connected to the second ring, the rings are approximately parallel to each other, the lengths of said bars being equal and from three to six times the diameter of said rings.

4,872,241

PATTY MOLDING MECHANISM FOR FIBROUS FOOD PRODUCT

Scott A. Lindee, New Lenox, Ill., assignor to Formax, Inc., Mokena, Ill.

Filed Oct. 31, 1988, Ser. No. 264,870
Int. Cl.[4] A22C *7/00*
U.S. Cl. 17—32 **15 Claims**

1. In a molding mechanism for molding food patties from a fibrous food product, which molding mechanism comprises:

fill directing means including a fill member having a first planar surface with at least one fill port extending through the fill member and the first planar surface;

cover means including a cover member having a second planar surface in parallel spaced relation to the first planar surface;

a mold plate having opposed planar surfaces, positioned in close fitting relation between the first and second planar surfaces, the mold plate having at least one mold cavity of predetermined configuration and area therethrough, the

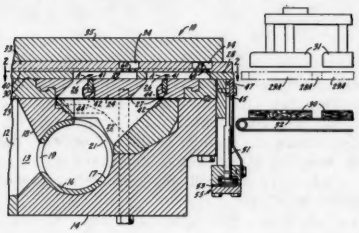
area of the mold cavity being substantially larger than the area of the fill port at the first planar surface;

mold plate drive means for driving the mold plate, cyclically, in a given direction from a fill position in which the mold cavity is aligned with the fill port to a discharge position in which the mold cavity is displaced beyond the fill member, and for subsequently driving the mold plate to its fill position;

food pump means for pumping a fibrous food product, under pressure, through the fill port to fill the mold cavity and form a food patty in the mold cavity; and

knockout means for pushing a molded food patty from the mold cavity at the discharge position of the mold plate;

the improvement in which:



the fill directing means includes a transitional rim for the fill port, adjacent the first planar surface, past which the food product flows into the mold cavity with an appreciable change of direction, the transitional rim having a rounded curvature that precludes appreciable damage to fibers in the food product; and

the fill directing means further includes a cutting rim for the fill port, at the first planar surface, past which at least a part of the mold cavity moves when the mold plate is driven toward its discharge position, the cutting rim having a sharp edge for shearing food product from the food patty along a plane coincident with the first planar surface.

4,872,242

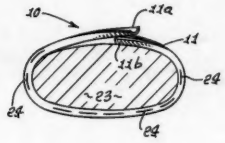
FLEXIBLE C-SHAPED STRAP-LIKE CONNECTOR

Robert M. Allan, 1731 Colgate Cir., La Jolla, Calif. 92037

Filed Apr. 7, 1988, Ser. No. 178,909

Int. Cl.[4] B65D *63/00*

U.S. Cl. 24—16 PB **25 Claims**



1. An elongated connector comprising:

(a) a flexible, lengthwise elongated, strap-like body consisting of synthetic resin and having generally C-shaped cross-section in planes crosswise of and normal to the length dimension of the body,

(b) the body having opposite C-shaped end portions which are interfitted so that one C-shaped cross-section end portion nests in and is gripped by the other C-shaped cross-section end portion each C-shaped cross section end portion having opposite walls that terminate at free edges, the walls of said one end portion yieldably deflected toward one another and gripped by the walls of said other end portion which are yieldably expanded away from one another.

4,872,243

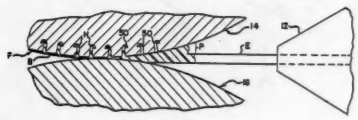
MULTI-HOOK FASTENER MEMBER

James R. Fischer, Sheboygan, Wis., assignor to Velcro Industries B.V., Amsterdam, Netherlands

Division of Ser. No. 865,575, May 15, 1986, Pat. No. 4,794,028, which is a continuation of Ser. No. 600,990, Apr. 16, 1984, abandoned. This application Sep. 9, 1988, Ser. No. 243,083

Int. Cl.[4] A44B *18/00*

U.S. Cl. 24—442 **3 Claims**



1. An elongate member, comprising: a base portion; and a great multiplicity of resiliently flexible hook-like projections extending from one surface of said base portion, said hook-like projections including free end portions extending generally toward said base portion, with at least some adjacent ones of said projections, in a direction along the length of said member, extending in generally opposite directions; said base portion and integral projections being formed from an extrusion of molten plastic material by providing a first, cooled forming roller having a plurality of hook-forming cavities defined about the periphery thereof wherein each said cavity includes a throat portion adjacent the periphery of said forming roller having an inwardly tapering configuration, and each said cavity includes an inner end portion communicating with the throat portion thereof and extending in a direction back toward the periphery of said forming roller; providing a second pressure roller in position for coaction with said first forming roller; concurrently rotating said first and second rollers in opposite directions about respective parallel axes; directing said extrusion in between said first and second rollers at an interface thereof so that said plastic material fills said hook-forming cavities to form said base portion of said strip-like fastener member and with said hook-like projections extending integrally from one surface of the base portion, each said hook-like projection having a free end portion; cooling said fastener member to a desired temperature by carrying it on the periphery of said rotating cooled forming roller through a substantial portion of a revolution of said forming roller; and removing said strip-like fastener member from said first forming roller at a position spaced from the interface of said first and second rollers by maintaining tension on the elongated fastener member thus-formed so that said hook-like projections are withdrawn from said hook-forming cavities, after being sufficiently cooled so that unacceptable deformation of the hook-like projections is avoided, without opening said cavities by drawing the free end portion of each said hook-like projection through the throat portion of the respective one of said cavities, the free end portion of each said hook-like projection extending generally toward the base portion of said fastener member.

4,872,244

TURRET WITH SEVERAL DRIVABLE TOOL SPINDLES FOR A MACHINE TOOL

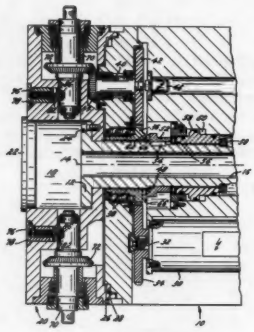
Günter Schleich, Hochdorf, Fed. Rep. of Germany, assignor to Index-Werke Comm.-Ges. Hahn & Tessky, Esslingen, Fed. Rep. of Germany

Filed Aug. 30, 1988, Ser. No. 238,310

Claims priority, application Fed. Rep. of Germany, Sep. 11, 1987, 3730561

Int. Cl.[4] B23B *29/32*

U.S. Cl. 29—40 15 Claims



1. Turret comprising a turret body and a turret head rotatable about an indexing axis relative to said turret body, said turret head being displaceable along said indexing axis from a working position in which it is non-rotatably held on said turret body into an indexing position in which it is rotatable about said indexing axis, several spindles being rotatably mounted in said turret head, each of said spindles being in rotary drive connection with a spindle gear and being able to be brought into a working position by rotation of said turret head, further comprising a drive element rotatably mounted in said turret body and being in drive connection with a rotary encoder for driving a switchable coupling for indexing said turret head and for driving a drive shaft rotatably mounted in radially spaced relation to said indexing axis in said turret body, and also comprising a drive gear engageable with the spindle gear of a spindle which is in the working position, characterized in that said spindle gear of a spindle which is in the working position is engageable with and disengageable from said drive gear of said drive shaft by displacement of said turret head between its indexing position and its working position, in that a switchable locking mechanism is provided for each spindle, and in that a releasing mechanism activatable by displacement of said turret head into its working position is provided on said turret body to release said locking mechanism of said spindle in the working position.

4,872,245

METHOD AND APPARATUS FOR MANUFACTURING COLD-ROLLED STEEL STRIP

Yoshiki Kawasaki; Yoshihiro Hioki; Yuichi Ohno, all of Himeji; Kozaburo Ichida; Susumu Yamaguchi, both of Kitakyushu; Michitaka Sudo, Tokyo, and Bunichiro Chikazawa, Kitakyushu, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Continuation of Ser. No. 838,563, Mar. 11, 1986, abandoned. This application Jan. 11, 1988, Ser. No. 143,311

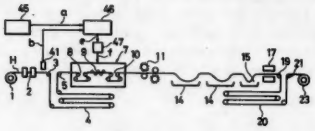
Claims priority, application Japan, Mar. 15, 1985, 60-50344; Nov. 22, 1985, 60-261294; Nov. 22, 1985, 60-261295

Int. Cl.[4] B21C *43/00*

U.S. Cl. 29—81 A 27 Claims

1. A method of removing mill scale from the surface of hot-rolled strip coil in the manufacture of cold-rolled steel strip using an apparatus comprising an uncoiler linked to a scale removing unit by a first looper, a tandem cold-reduction mill linked to the scale removing unit by a second looper and a continuous annealing unit linked to the tandem cold-reduction mill by a third looper, comprising the steps of:

breaking the mill scale on the surface of the hot-rolled strip coil by elongating the running hot-rolled strip coil to a predetermined percent elongation, controlling the predetermined percent elongation during the elongating of the hot-rolled strip coil as a function of at least one of the manufacturing conditions of the hot-rolled strip coil and the properties and quantity of the mill scale on the hot-rolled strip coil so that the top, bottom and middle thereof of the hot-rolled strip coil will be pickled at substantially the same speed; and



removing the broken scale from the surface of the elongated hot-rolled strip coil.

4,872,246

ROLL WITH AN ARCHED SHAFT

Akechi Yano, 2, Kikusuidori 4-chome, Moriguchishi, Osakafu, Japan

Continuation of Ser. No. 14,887, Feb. 13, 1987, abandoned. This application Jan. 11, 1989, Ser. No. 296,289

Claims priority, application Japan, Jul. 3, 1986, 61-51090; Jul. 3, 1986, 61-51091

Int. Cl.[4] B21B *13/02*

U.S. Cl. 29—116.1 7 Claims

1. A roll for feeding articles comprising:

a curved support shaft in a fixed position under a no-load condition; and

a roller mounted to rotate around said curved support shaft without any rotation of said support shaft, said roller having a surface layer and a circumference which increases progressively from a central portion of the roller to the ends thereof, said surface layer deforming with cyclical expansion and contraction in a direction of a width of said roller or deforming with cyclical amplitude alteration in a radial direction while being rotated about said curved support shaft such that at least one axial straight line is defined along an external periphery of said surface.

4,872,247

COMBINATION ROLL

Hironori Nakamura, Fujimi; Toshiaki Yotsui, Kawasaki; Youichi Sato, Ichihara; Toshiaki Umetsubo, Fuji, and Hideo Ohkawa, Higashimatsuyama, all of Japan, assignors to CALP Kogyo Kabushiki Kaisha, Tokyo, Japan

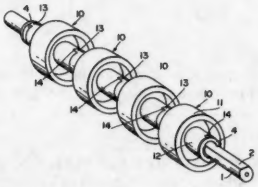
PCT No. PCT/JP87/00183, § 371 Date Jun. 22, 1988, § 102(e) Date Jun. 22, 1988, PCT Pub. No. WO88/01977, PCT Pub. Date Mar. 24, 1988

PCT Filed Mar. 26, 1987, Ser. No. 209,480

Claims priority, application Japan, Sep. 9, 1986, 61-138406[U]; Sep. 9, 1986, 61-138407[U]

Int. Cl.[4] B21B *31/00*

U.S. Cl. 29—125 **2 Claims**



1. A combination roll including:

(a) a roll shaft having locking end portion; and

(b) a plurality of roll units, including an end roll unit, mounted on said roll shaft, each of said roll units comprising a roll portion of a first diameter and a shaft inserting portion of a second diameter, said second diameter being less than said first diameter, said roll portion being formed with a contact portion and said shaft inserting portion being concentric with said roll portion and having opposite ends and, at each of said opposite ends, engaging means engageable with a corresponding shaft inserting portion of an adjacent roll unit, said end roll unit having a locking means for locking itself to said locking end portion of said roll shaft so that once said end roll unit is locked to said roll shaft all of the remaining roll units are indirectly locked to said roll shaft by means of said engaging means and all of said roll units are rotatable conjointly with said roll shaft.

4,872,248

METHOD OF MAKING A PLAIN BEARING SHELL

Erich Roemer, Wiesbaden; Matthäus Kühn, Östrich-Winkel, and Leonhard Maurer, Walluf, all of Fed. Rep. of Germany, assignors to Glyco-Metall-Werke, Daelen & Loos GmbH, Wiesbaden, Fed. Rep. of Germany

Division of Ser. No. 514,311, Jul. 15, 1983, Pat. No. 4,775,249. This application Jun. 9, 1988, Ser. No. 204,372

Claims priority, application Fed. Rep. of Germany, Aug. 18, 1982, 3230700

Int. Cl.[4] B21D *53/10*

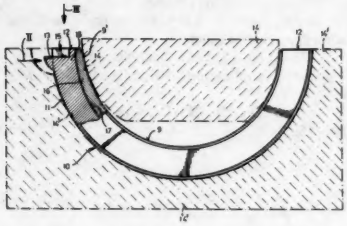
U.S. Cl. 29—149.5 DP **4 Claims**

1. A method of making a plain bearing shell which comprises the steps of:

forming a generally cylindrical bearing shell body having an inner functional surface and a joint face lying in a plane substantially parallel to an axis of said generally cylindrical bearing shell body;

supporting said functional surface and the exterior of said generally cylindrical bearing shell body at least in a region of said joint face; and

depressing material of said generally cylindrical bearing shell body only at a region outwardly of said functional surface in said region of said joint face in a direction perpendicular to said joint face to form a lug radially projecting from the exterior of said generally cylindrical bearing shell body and forming a recess directly above said lug, said lug facilitating positioning of said generally cylindrical bearing shell body while leaving a layer of material of said generally cylindrical bearing shell body between said recess formed by the depression of said



material of said generally cylindrical bearing shell body and said functional surface.

4,872,249

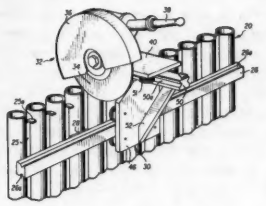
TOOL SUPPORT AND GUIDE SYSTEM FOR REPAIR OF BOILER TUBE PANELS AND PROCESS FOR CARRYING OUT REPAIR USING SAME

Jerald VanderPol, Eldorado Hills; Cory J. Silber, Sacramento, and William H. Astle, Rancho Cordova, all of Calif., assignors to Tri Tool Inc., Rancho Cordova, Calif.

Filed Jul. 28, 1988, Ser. No. 225,174

Int. Cl.[4] B23P *15/26*

U.S. Cl. 29—157.4 **9 Claims**



1. A tool support and guide system for end preparation of cut ends of tubes extending along a straight line and connected together by membranes to form a tube panel, said panel having secured thereto a first guide rail means extending parallel to and adjacent the line of cut tube ends to be prepared, said first guide rail means including a guide roller receiving profile for receiving guide rollers in cooperating relationship comprising:

a first support carriage means including a first guide roller assembly mounted for movement along the first guide rail means with the first guide roller assembly engaging the guide roller receiving profile of the first guide rail in cooperating relationship;

a second guide rail means carried by said first support carriage means and extending normal to said first guide rail means in a direction towards and generally perpendicular to the cut panel tubes;

said second guide rail means including a guide roller receiving profile conforming in configuration with the guide roller receiving profile of said first guide rail means.

4,872,250

METHOD FOR FABRICATING A DISHED HOLLOW BODY POSSESSING A LINEAR OR HELICAL INNER TOOTHING

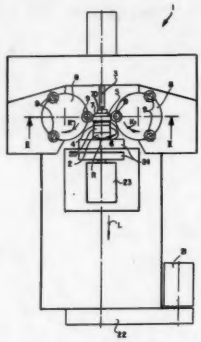
Franco De Marco, Jona, Switzerland, assignor to Ernst Grob AG, Männedorf, Switzerland

Filed Sep. 17, 1987, Ser. No. 97,749

Claims priority, application Switzerland, Sep. 18, 1986, 03747/86

Int. Cl.[4] B21D *19/00*

U.S. Cl. 29—159.2 **11 Claims**



1. A method for fabricating a substantiallly dished hollow body possessing straight or helical internal teeth, having at least a partial web portion and a substantially tubular rim portion connected to said web portion, comprising the steps of:

providing a workpiece blank which, in longitudinal section, possesses a rounded portion in a transition region between a rim porion, having a predetermined wall thickness, and a web portion thereof;

forming said rounded portion with a mean radius of curvature which is at least as large as the predetermined wall thickness of said rim portion of said workpiece blank;

providing a mandrel which possesses external teeth corresponding to said internal teeth which are to be fabricated on the workpiece blank; and

cold working said rim portion of the workpiece blank on the mandrel according to the Grob method to form the substantially dished hollow body with internal teeth up to the proximity of said web portion of said workpiece blank.

4,872,251

FENDER FAST CLIP REMOVER

Harold A. Sheppard, 1432 Foxcroft Dr., Muskogee, Okla. 74403

Filed Aug. 24, 1988, Ser. No. 235,571

Int. Cl.[4] B25B *7/02*

U.S. Cl. 29—243.56 **4 Claims**

1. A fast clip removal tool, comprising:

a pair of handles pivotally connected intermediate their ends for movement of their respective end portions toward and away from each other;

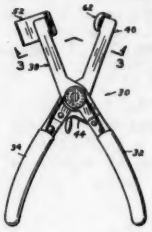
an anvil jaw one end of one said handle; and,

a striker jaw cooperatively disposed on one end portion of the other said handle for movement of said jaws toward and away from each other,

said striker jaw being generally strap-like and U-shaped having one leg of the U-shape fixed to the said other handle end portion and having the other leg of the U-shaped projecting toward said anvil jaw,

both said jaws cooperatively projecting laterally normal to the longitudinal axis of the respective said handle,

said anvil jaw being substantially right angular in transverse section with one flange of the right angle secured to the one said handle and the other flange of the right



angle projecting toward and inclined downwardly with respect to the plane of the striker jaw said other leg.

4,872,252

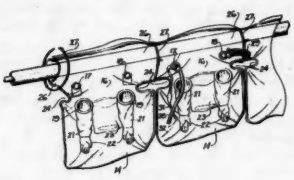
METHOD OF REMOVING HAZARDOUS MATERIAL

Kurt D. Hittler, Atlanta, Ga., assignor to Grayling Industries, Inc., Alpharetta, Ga.

Division of Ser. No. 278,732, Dec. 2, 1988. This application May 15, 1989, Ser. No. 351,530

Int. Cl.[4] B23P *19/02, 6/00*

U.S. Cl. 29—426.4 **5 Claims**



1. A method of removing hazardous material from an elongated pipe comprising the steps of:

(a) mounting to the pipe a bag of the type that has a series of debris collection pouches joined to a manifold at a series of necks and with the bag being mounted with the manifold secured about the pipe and the pouches depending downwardly therefrom with internal communication established between the pouches and manifold;

(b) stripping material from the pipe whereupon the stripped material falls as debris into at least one of the pouches;

(c) isolating the one pouch from the manifold by twisting and tieing off the neck that joins the one pouch with the manifold; and

(d) severing the pouch from the manifold whereby the isolated one pouch containing debris is separated from the manifold without interruption in internal communication of the manifold with the remaining pouches and without exposure of its debris to ambient air.

4,872,253

APPARATUS AND METHOD FOR IMPROVING THE INTEGRITY OF COUPLING SECTIONS IN HIGH PERFORMANCE TUBING AND CASING

Kenneth J. Carstensen, 4540 No. 44th St., No. 70, Phoenix, Ariz. 85018

Filed Oct. 7, 1987, Ser. No. 105,339

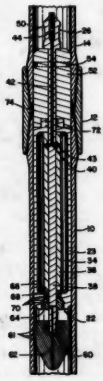
Int. Cl.[4] B21D *39/00*

U.S. Cl. 29—507 **6 Claims**

1. A system for operation during makeup of successive tubing or casing sections where a first tubing or casing section has a coupling collar threaded onto an open end and a second

tubing or casing section is added to the first tubing or casing section through the coupling collar to form an anticipated gap area that will exist between opposed nose ends of the tubing or casing sections within the collar when makeup has been completed, comprising:

a cylindrical member insertable within the tubing or casing sections and including means for releasably engaging the inner wall of the first tubing or casing section in sealing relation on one side of the anticipated gap area opposite the collar, and including further a rigid member having an



outer diameter slightly less than the inner diameter of the tubing or casing section and spanning the anticipated gap area between opposed nose ends:

means for filling the area about the rigid surface within the anticipated gap area with a catalyzed resin in liquid form; and

means for removing the inserted member from the open end of the added, second tubing or casing section on the opposite side of the gap area from the first tubing or casing section and past the gap area after solidification of the resin.

4,872,254

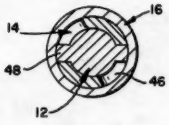
WHEEL STUD INSTALLER AND METHOD

James C. Chancellor, 300 NE. 12th St., Big Spring, Tex. 79720

Filed Mar. 7, 1989, Ser. No. 319,986

Int. Cl.[4] B23P *19/02, 19/04*

U.S. Cl. 29—525 **8 Claims**



1. Apparatus for installing threaded wheel studs in a vehicular hub, said apparatus comprising a hydraulic actuator means, a stud coupling, a cylinder coupling, and a spacer sleeve;

said stud coupling further comprising means for threadedly engaging said wheel stud and means for releasably engaging said cylinder coupling;

said cylinder coupling comprising means for releasably engaging said stud coupling and means for releasably engaging actuator means adapted to exert a pulling force on said wheel stud through said cylinder coupling and said stud coupling; and

said spacer sleeve further comprising a longitudinal bore adapted to receive said stud coupling and said cylinder coupling when said stud coupling and said cylinder coupling are engaged, and said spacer sleeve being further adapted to maintain said actuator means a fixed distance from said hub as said pulling force is exerted on said wheel stud.

7. A method for installing a wheel stud in a vehicular hub, said method comprising the steps of:

a. inserting a wheel stud outwardly through said vehicular hub;

b. providing an apparatus comprising a stud coupling a cylinder coupling, and a spacer sleeve for use in seating said wheel stud in said vehicular hub;

c. threadedly engaging said stud coupling to said wheel stud, and releasably engaging said stud coupling to said cylinder coupling;

d. providing a longitudinally extendable, hydraulically actuated means adapted to exert a pulling force on said wheel stud through stud coupling and said cylinder coupling;

e. said spacer sleeve over said stud coupling and said cylinder coupling;

f. releasably engaging said hydraulically actuated means to said cylinder coupling; and

g. thereafter operating said hydraulically actuated means to exert a pulling force on said wheel stud through said stud coupling and said cylinder coupling.

4,872,255

METHOD OF MANUFACTURING COMMUTATORS

Boris Kogej, and Joze Potocnik, both of Idrija, Yugoslavia, assignors to Kolektor P.O., Idrija, Yugoslavia

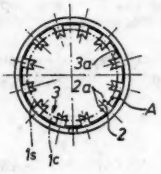
Continuation of Ser. No. 871,141, Jun. 3, 1986, abandoned, which is a continuation of Ser. No. 651,870, Sep. 18, 1984, abandoned, which is a continuation of Ser. No. 543,230, Oct. 21, 1983, Pat. No. 4,484,389, which is a continuation of Ser. No. 335,350, Dec. 21, 1981, abandoned. This application Dec. 10, 1987, Ser. No. 132,654

Claims priority, application Yugoslavia, Sep. 29, 1981, 2346/81

The portion of the term of this patent subsequent to Nov. 27, 2001, has been disclaimed.

Int. Cl.[4] H01R *43/08*

U.S. Cl. 29—597 **11 Claims**



1. A method of manufacturing commutators of the type comprising mutually separated commutator lamellas having an exposed commutator side and an opposite side shaped with integral protruding portions forming anchoring elements which are initially part of a commutator body, whereby the commutator lamellas are produced from an elongated blank, said method comprising: providing an elongated blank having at least one longitudinal margin of reduced thickness and a longitudinal thicker portion; deforming without cutting areas of said thicker portion to displace material from said portion upwardly to form a plurality of spaced apart longitudinal ribs with a longitudinal groove formed between adjacent longitudinal ribs, each said rib having two upwardly and outwardly extending longitudinal ridges to form anchoring elements; forming the blank into a cylinder before the deforming without cutting, with the thicker portion facing inwardly; molding said

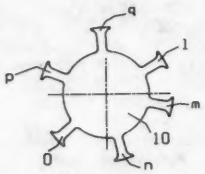
deformed cylindrical blank with an insulating plastic material to encapsulate the anchoring elements; and cutting through said blank along said grooves to define a plurality of separated lamellas peripherally spaced about the cylinder with each lamella having its associated anchoring element encapsulated in the insulating plastic material.

4,872,256

PROCESS FOR PRODUCING A SQUIRREL-CAGE ROTOR

Louis Plumer, Cluses, France, assignor to Somfy, Cluses, France

Filed Sep. 19, 1988, Ser. No. 246,256
Claims priority, application France, Oct. 2, 1987, 87 13655
Int. Cl.[4] H02K *15/02*
U.S. Cl. 29—598 **2 Claims**



1. A process for producing a squirrel-cage rotor for an induction motor, whereby packets of laminations are made by the method consisting in automatically cutting out and assembling rotor laminations of magnetic material by means of a follow-on machine in which the laminations are cut from a strip by means of selectable punches, rotated through a determined angle and provided with half-cutouts, and thereupon assembled in packets by means of the half-cutouts, the angle of rotation having the effect of forming helicoidal slots on the packet of laminations, and the packets of laminations are filled with a nonmagnetic conductive material, in which process in order to obtain an intermediate short-circuiting ring, removing teeth in an ordered manner from the laminations whose position in the packet corresponds to the desired situation of the intermediate short-circuiting ring, and the laminations cut out are turned through an angle corresponding to a whole number of teeth plus the angle of the desired helix, this whole number being different from the number of teeth of a lamination having a complete toothing and from a multiple thereof, and said removal being such that step-by-step rotations will result in a clear flow path around a short circuiting section for the nonmagnetic material filler, and in such a manner that when filling is effected a continuous annular zone of nonmagnetic material is obtained.

4,872,257

APPARATUS FOR INSTALLING BEARINGS ON ENGINE COMPONENTS

Takehisa Wakamori, Hidaka; Takashi Ogawa, Higashi Kurume; Ryoji Ito, Kawagoe, and Chikafumi Shimanaka, Sayama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 3, 1986, Ser. No. 915,275
Claims priority, application Japan, Oct. 4, 1985, 60-222568; Oct. 7, 1985, 60-224204; Oct. 7, 1985, 60-224205; Oct. 9, 1985, 60-225831; Oct. 16, 1985, 60-158134[U]; Dec. 2, 1985, 60-271152; Dec. 2, 1985, 60-271153; Dec. 27, 1985, 60-295778
Int. Cl.[4] B23P *21/00*
U.S. Cl. 29—701 **6 Claims**

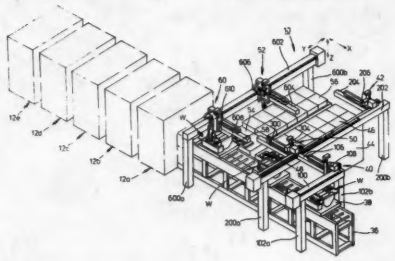
1. An apparatus for installing a bearing of semicylindrical shape on a variable engine component of an internal combustion engine, comprising:

data readout means for determining a specific one of a plurality of different engine bearing by reading data marked on the variable engine component;

bearing selecting means for selecting the bearing determined by the data read by said data readout means, and changing the attitude of said bearing:

positioning means for receiving the bearing from said bearing selecting means; and

bearing installing means for installing the bearing received by said positioning means on the variable engine component;



wherein said positioning means comprises a first positioning means for positioning the bearing with its convex side down, and the second positioning means for positioning the bearing with its convex side up; and

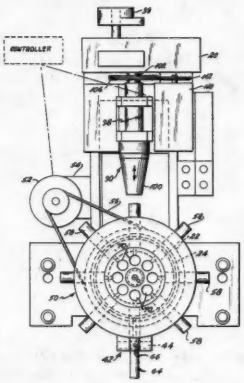
wherein said bearing installing means comprises a first installing mechanism having a curved surface for engaging an interior peripheral surface of the bearing, and a second installing mechanism comprising means for gripping the engine component.

4,872,258

PICK AND PLACE METHOD AND APPARATUS

Phillip A. Ragard, Binghamton, N.Y., assignor to Universal Instruments Corporation, Binghamton, N.Y.

Filed Sep. 22, 1988, Ser. No. 247,512
Int. Cl.[4] B23P *19/04*
U.S. Cl. 29—740 **14 Claims**



1. In an apparatus for selectively performing the operations of picking components from one point and placing them at another point by means of a turret assembly having a rotatable turret with plural component holding spindles protruding therefrom and angularly spaced about a hub thereof, said picking and placing operations being performed by transferring components respectively to and from said spindles at a component transfer station of said turret assembly wherein said

component transfer station is situated at a particular circumferential angular location about the hub of said turret, the improvement comprising:

displacer means for extending and retracting at least one of said spindles relative to said hub in order to perform said transferring;

said displacer means comprising a pin protruding laterally from said at least one spindle and into an annular groove of a guide ring generally centered on said hub, such that said pin rides in said groove during rotation of said turret to retain said spindle in a retracted condition;

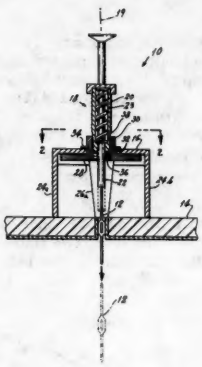
said displacer means further comprising a section of said guide ring which is displaceable generally radially of said hub relative to the remainder of said guiding, said section comprising an arcuate portion of said annular groove; means for moving said section, so that when pin extends into the annular groove of said section, radial displacement of said section results in radial displacement of said spindle into an extended condition.

4,872,259

ADJUSTABLE FOOTPRINT COMPONENT REMOVAL TOOL

Gerald M. Jones, Titusville, and Rhonda L. Nemcovsky, Warren, both of Pa., assignors to GTE Products Corporation, Stamford, Conn.

Filed Mar. 3, 1989, Ser. No. 319,388
Int. Cl.[4] H05K *13/04*
U.S. Cl. 29—764 **3 Claims**



1. An apparatus for removing a friction-fitted, axially aligned electrical component from a printed circuit board, said apparatus comprising:

a base;

a component removal tool mounted on said base, said tool having a longitudinal axis substantially normal to said base and being mounted for reciprocal movement along said longitudinal axis;

a first pair or legs mounted on said base and extending therefrom, said first pair of legs being fixed relative to said base; and

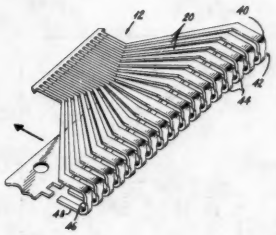
a second pair of legs mounted with said base and extending therefrom, said second pair of legs being rotatably adjustable relative to said first pair of legs, both said first and second pair of legs engaging said board during the removing of an electrical component therefrom.

4,872,260

METHOD OF MAKING PRE-FORMED LEAD-INS FOR AN IC PACKAGE

Robert R. Johnson, Ludlow, and Robert S. Orbanic, Warren, both of Pa., assignors to GTE Products Corporation, Stamford, Conn.

Filed Jan. 19, 1988, Ser. No. 145,337
Int. Cl.[4] H01R *43/00*
U.S. Cl. 29—827 **1 Claim**



1. The method of making pre-formed lead-ins for an IC package comprising, in sequence, the steps of:

(a) preparing a longitudinal strip containing a plurality of substantially identical lead frame segments, each lead frame segment having a multiplicity of lead-ins connected to opposing, first and second continuous rails, said lead-ins having spaces therebetween with the spaces being wider adjacent said second rail than adjacent said first rail;

(b) removing from between segments a section of said second rail;

(c) forming a first right angled bend in said lead-ins of said lead-frame segment, adjacent said second rail to provide a normal portion of said lead-ins;

(d) forming a second right angled bend in said normal portion of said lead-ins of said lead-frame segment to form a bight and a parallel portion of said lead-ins;

(e) removing said second rail; and

(f) forming a re-entrant portion in said parallel portion of said leads of said lead-frame segment to substantially complete said pre-formed lead-ins;

(g) separating said lead-frame segment from said strip;

(h) affixing said lead-frame segment to a lead frame support; and

(i) removing said first rail.

4,872,261

METHOD OF AND APPARATUS FOR SURFACE MOUNTING ELECTRONIC COMPONENTS ONTO A PRINTED WIRING BOARD

Amalendu Sanyal, Andover, Mass.; Peter Moy, Atkinson, N.H., and Frank Cosentino, Wakefield, Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

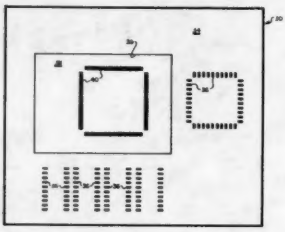
Filed Dec. 11, 1987, Ser. No. 131,652
Int. Cl.[4] H05K *3/34*
U.S. Cl. 29—840 **22 Claims**

1. A method of surface mounting electrical components, with leads extending therefrom, to a printed wiring board with surface contact pads by bonding the component leads to the printed wiring board surface contact pads, the printed wiring board including surface contact pads adapted for bonding standard pitch electronic component leads thereto and surface contact pads adapted for bonding fine pitch electronic components leads thereto, the method including the steps of:

(A) placing a stepped solder stencil over said printed wiring board, said stencil having a common flat surface disposed against the printing wiring board and an exposed surface opposite said flat surface, said stencil including at least two sections of different thickness, such that there is at least one thin section of a selected thickness and at least

one thick section having a thickness greater than that of said thin section, and openings formed in said stencil sections, said openings positioned so that when said stencil is aligned over the printed wiring board, said openings formed in said thick section are in registration over the surface contact pads for the standard pitch leads and said openings formed in said thin section are in registration over the surface contact pads for the fine pitch leads;

(B) applying solder paste over the exposed surface of said stencil;



(C) pressing said solder paste on said stencil exposed surfaces through said stencil openings whereby thick mounds of solder paste are deposited on the surface contacts for the standard pitch leads and thin mounds of solder paste are deposited on the surface contact pads for the fine pitch leads; and

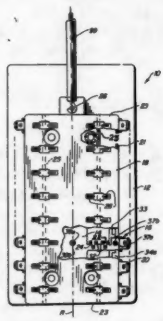
(D) removing said stencil so that said mounds of solder paste are left on the printed wiring board surface contact pads.

4,872,262

HOLDER FOR A BLADE-TYPE CIRCUIT ELEMENT

David R. Marach, Marengo, Ill., assignor to Cooper Industries, Inc., Houston, Tex.

Filed Aug. 15, 1988, Ser. No. 232,322
Int. Cl.[4] H01R *43/00*
U.S. Cl. 29—884 **22 Claims**



1. A method of making a holder for a plurality of plug-in electrical circuit protective devices for interrupting the flow of current flowing therethrough, comprising the steps of:

(a) forming, from a blank of electrically conductive material, at least two branches which are separated from each other by a spaced distance and which are joined to a common trunk member, each of said branches having a free end and two edges which join said free end to said trunk member;

(b) forming, along at least one edge of each branch of said blank, a pair of spaced apart terminals which are adapted to removably receive the ends of a common plug-in electrical circuit protective device;

(c) mounting said branches and said trunk of said blank on a generally flat insulated base; and

(d) splitting each branch at a position intermediate its terminals to form a plurality of severed branch portions and attached branch portions which are carried by said insulated base, whereby those terminals of each attached branch portion are joined to said trunk member and are connected to each other to form a common electrical supply bus

(e) positioning an insulated member, on said base, to cover all but said free end of each severed branch portion and at least part of said severed branch portions and said trunk member of said blank, said insulated member having at least one aperture therein of sufficient size to receive one plug-in electrical circuit protective device; and

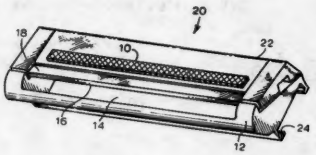
(f) aligning said insulated member to have said at least one aperture over one pair of said spaced apart terminals.

4,872,263

LUBRICATING DEVICE

Robert W. Etheredge, III, Natick, Mass., assignor to The Kendall Company, Boston, Mass.

Filed Sep. 30, 1988, Ser. No. 252,822
Int. Cl.[4] B26B *19/44*
U.S. Cl. 30—41 **29 Claims**



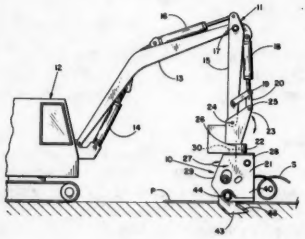
1. A lubricating device comprising: (1) a porous matrix impregnated with a lubricating composition consisting essentially of an acid soap of at least one unsaturated higher fatty acid having at least 16 carbon atoms; and (2) a water-insoluble perforated sheet material adhered to one surface of said impregnated porous matrix and through which said lubricating composition can diffuse when moistened.

4,872,264

HEAVY DUTY PLATE SHEAR

Roy E. LaBounty, HC2 Box 105E, Two Harbors, Minn. 55616

Filed Jan. 11, 1988, Ser. No. 142,654
Int. Cl.[4] B23P *19/00*
U.S. Cl. 30—210 **27 Claims**



1. A heavy-duty plate cutting shear to be carried on an elevated lifting device, comprising

frame means with mounting means for attaching to such a device,

a slidable foot affixed on the frame means and having an

unobstructed base face for engaging and sliding along the plate being sheared, the slidable foot having an elongate slot opening through the base face and also having metal shearing edges at both sides of the slot and adjoining the face,

a swingably oscillatable blade having pivot means mounted on the foot, the blade being in the slot and extending from the pivot means and across the base face, the blade having metal cutting edges confronting and traversing the shearing edges on the foot,

and a hydraulic cylinder on the frame means and connected with the blade in the slot and oscillating the blade across the shearing edges of the foot.

4,872,265

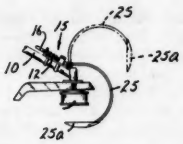
TRIMMER ATTACHMENT

David W. Powell, 11020 Upper Mount Vernon Rd., Mount Vernon, Ind. 47620

Filed May 2, 1988, Ser. No. 188,856

Int. Cl.[4] B26B *7/00*

U.S. Cl. 30—296 A **8 Claims**



1. An attachment for an implement including a support shaft and a cutter in the form of a rotatable mono-filament used for lawn trimming mounted at the free end thereof comprising a base secured to said support shaft, a spacer pivotally mounted on said base and selectively engaging and movable on a lawn area, said spacer serving to maintain said cutter vertically distant from said lawn area at an operative position so as to avoid lawn scalping while trimming, and means mounted on said base and cooperable with said spacer selectively locking said spacer at said operative position.

4,872,266

PLASTIC FRAME WITH EMBEDDED SHEARING FOIL

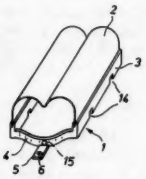
Albert Greutert, Sachseln, and Ruedi Gasser, Luzern, both of Switzerland, assignors to Maxs AG, Sachseln, Switzerland

Filed Jan. 21, 1988, Ser. No. 146,314

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1987, 3702526

Int. Cl.[4] B26B *11/04*

U.S. Cl. 30—346.51 **5 Claims**



1. In combination a plastic frame and a vaulted shearing foil, said frame including a pair of opposing longitudinal strut portions to which said foil is attached and a pair of transverse strut portions interconnecting the longitudinal strut portions, the longitudinal strut portions being provided with fastening means to hold the plastic frame in a casing member of a dry shaver, characterized in that said transverse strut portions are resilient to allow movement of the longitudinal strut portions toward and away from each other, said transverse strut portions having an untensioned state which in their longitudinal direction deviates from a straight line, said transverse strut portions each including a center section reduced in cross-section to accommodate buckling of the transverse strut portions.

4,872,267

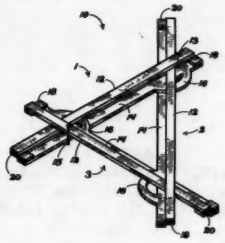
MEASURING DEVICE

Randy Anderton, Route 1 Box 46, Alcester, S. Dak. 57001

Filed Jun. 27, 1988, Ser. No. 212,253

Int. Cl.[4] G01B *5/24*

U.S. Cl. 33—463 **6 Claims**



1. A measuring device, comprising:

three straight leg portions interconnected in a triangular configuration;

each of said leg portions mounted for linear sliding movement on each two adjacent leg portions;

each of said leg portions including a pair of elongated strips connected in spaced parallel relation forming a slot therebetween; and

one strip of each of two adjacent leg portions slidably received in said slot.

4,872,268

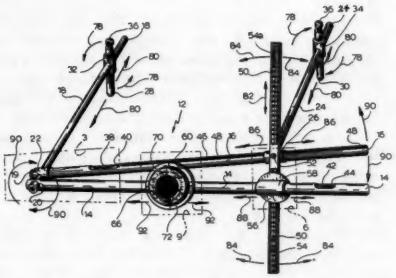
SKELETON DEVICE

Ronald Perrault, 3 avenue des Sapins, Notre-Dame-des-Prairies, Canada J6E 1C3

Filed Apr. 20, 1988, Ser. No. 186,094

Int. Cl.[4] G01B *3/02*

U.S. Cl. 33—512 **9 Claims**



1. A skeleton-measuring device comprising one and another main arms, said arms being elongated, rigid, and cylindrical; first mounting means interconnecting said arms for pivotal movement of said another arm relative to said one arm about a first plate; support means for supporting said another arm over

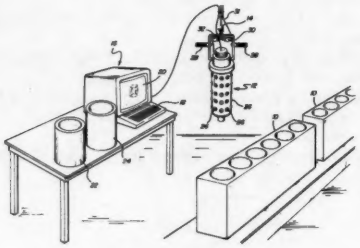
joint portions of a human body; level means for monitoring horizontal levelling of both of said arms; a scale member connected to said one arm by second mounting means and to said another arm by third mounting means, for both pivotal movement about a second plane parallel to said first plate and lengthwise displacement relative to either of said arms; and scale means for measuring the lengthwise displacement of the scale member relative to said another arm; wherein said support means includes one and another rod member, said one rod member fixedly connected to said another arm, said another rod member connected to said another arm by said third mounting means and adapted for lengthwise displacement relative to said another arm, said rod members orthogonal to said first plane of pivotal movement of said another arm.

4,872,269

AUTOMATIC CYLINDER PROFILING GAGE

Karl Sattmann, 941 Viewland, Rochester Hills, Mich. 48064

Filed Apr. 8, 1988, Ser. No. 179,261
Int. Cl.[4] G01B *7/12*
U.S. Cl. 33—552 **19 Claims**



1. An automatic cylinder profiling gage comprising:

I. a generally cylindrical measuring head adapted to fit into a cylinder being profiled and including;

centering means for maintaining the head in an approximately centered relationship within the interior of the cylinder,

a plurality of transducers associated with the head, each transducer including a measuring probe extensible from the surface of the head and adapted to generate a positional signal corresponding to the distance from the head to the interior wall of the cylinder without deforming the interior wall of the cylinder, said transducers disposed in spaced apart relationship so as to substantially simultaneously contact a plurality of points along the length and circumference of said interior wall and substantially simultaneously generate a plurality of positional signals;

II. a signal processor disposed so as to receive the positional signals from the plurality of transducers, compare said signals with stored values corresponding to positional signals obtained from an ideal cylinder and generate a profile signal indicative of the deviation of the measured cylinder from the ideal cylinder; and

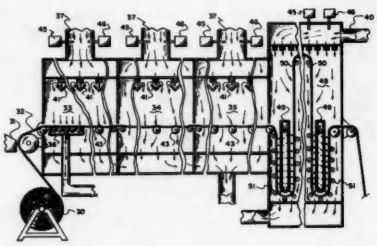
III. display means in operative communication with the signal processor and adapted to receive the profile signal and provide a visual display corresponding thereto.

4,872,270

DRYING PROCESS

Dennis R. Fronheiser, Rochester; Jack Hayward, Hilton; Gerald G. Reafler, Rochester, and James R. Schuler, Brockport, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 9, 1988, Ser. No. 166,083
Int. Cl.[4] F26B *3/02, 13/00*
U.S. Cl. 34—23 **15 Claims**



1. A process for drying a coating of wet latex paint on a heat-deformable plastic film, the paint containing water, one or more higher boiling organic solvents and a colloidally dispersed, coalescable, hardenable, elastomeric film-forming polymer to obtain a smooth, stretchable dried paint layer substantially free of bubble defects, which comprises

passing continuously through a series of drying stages a heat-deformable plastic carrier film having an upper and an under surface and having on its upper surface a coating of the wet latex paint,

introducing a flow of heated, moderately humid air to each stage to supply heat and cause evaporation of water and organic solvent, the air flow in at least the first three stages being so directed that more than half of the heat required for evaporation is supplied to the film through its under surface,

in a first stage of at least 30 seconds duration, controlling the evaporation conditions, including the flow rate, humidity and temperature of the air to maintain the temperature of the paint layer within about 10 degrees C below and 5 degrees C above its initial temperature,

in a second stage of at least 30 seconds duration maintaining conditions which heat the paint layer to a temperature higher than in said first stage but no higher than 10 degrees C above its initial temperature,

in a third stage of at least 30 seconds duration maintaining conditions which heat the paint layer to a temperature higher than in said second stage but no higher than 25 degrees C above its initial temperature;

thereafter in a final stage maintaining conditions which heat the paint layer to a maximum temperature at least 30 degrees C higher than the highest temperature in the third stage and at least 50 degrees C higher than its initial temperature for sufficient time to evaporate remaining water and organic solvent and harden the paint layer, the temperature being below the heat deformation temperature of the carrier film.

4,872,271

SHOE HEEL SCUFF PROTECTOR

Dorothy E. Allen, 18710 Fenelon, Detroit, Mich. 48234

Filed Oct. 11, 1988, Ser. No. 255,849
Int. Cl.[4] A43B *13/22*
U.S. Cl. 36—72 B **16 Claims**

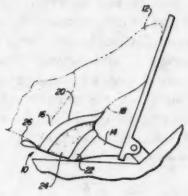
1. A protective device for a shoe having a heel, a shank and a counter comprising:

an upper elastic endless band;

a lower elastic endless band being smaller in circumference than the upper band;

said upper and lower bands being effective to grip the shoe adjacent the heel and counter, the upper band being disposed around the shoe counter and shank, the lower band being disposed around the shoe heel adjacent the counter;

an endless elastic wall interconnecting the upper and lower bands respectively and being gathered at its upper and lower edges for shielding the shoe heel and counter; and



a flexible loop extending across and upwardly from the upper band's inner surface, said loop being reversely bent and continuing downward across the upper band's outer surface wherein said loop serves as a pull for the installation of the device over the shoe heel and counter.

4,872,272

DETACHABLE BINDING DEVICE FOR A SKI BOOT

Heinz Wittmann, Vienna; Roland Erdei, Pottendorf, and Tibor Szasz, Vienna, all of Austria, assignors to TMC Corporation, Switzerland

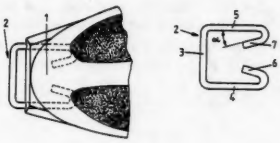
PCT No. PCT/EP87/00211, § 371 Date Jan. 5, 1988, § 102(e) Date Jan. 5, 1988, PCT Pub. No. WO87/06802, PCT Pub. Date Nov. 19, 1987

PCT Filed Apr. 18, 1987, Ser. No. 174,993

Claims priority, application Austria, May 7, 1986, 1220/86

Int. Cl.[4] A43B *5/04;* **A63C** *9/00*

U.S. Cl. 36—117 **8 Claims**



1. A device for detachably fastening a ski boot to a ski binding, comprising:

a hook element (2) extending in a longitudinal direction of said ski boot and being rigidly connected to a travel sole (9) of said ski boot, said hook element including a plurality of bent portions, a cross rod fixed into a predetermined distance away from the front end of said ski boot and extending transverse to said longitudinal direction, and first and second legs (4, 5) extending in said longitudinal direction, each of said legs including at least one segment (6, 7) bent in the plane of said hook element by a first predetermined angle (alpha) toward said cross rod.

4,872,273

SPIKE SHOE SLIP

Clifford G. Smeed, 3625 Keating, 190 1, San Diego, Calif. 92110

Continuation-in-part of Ser. No. 132,335, Dec. 14, 1987, abandoned. This application Jul. 29, 1988, Ser. No. 226,142

Int. Cl.[4] A43B *5/00, 3/10;* **A43C** *13/12*

U.S. Cl. 36—135 **11 Claims**

1. A slip, for use with a sports enthusiast shoe having a heel, sole, and toe portions, and having anti-skid protrusions on a bottom surface of said shoe's sole and heel portions, said slip comprising:

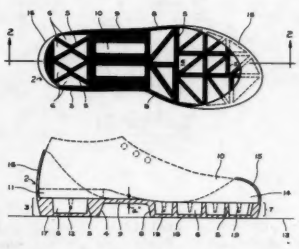
a semi-rigid sole membrane capable of being placed proximate to said sole and generally covering a portion of said bottom surface of said sole;

first means for removably attaching said sole membrane to said shoe;

a stretchable midsection membrane attached to said sole membrane distal from said first means for attaching;

a semi-rigid heel membrane attached to said midsection distal from said sole membrane, said heel membrane capable of being placed proximate to said heel generally covering a portion of said heel bottom;

second means for removably attaching said heel membrane to said shoe;



a generally rigid heel segment attached to said heel membrane, said heel segment having a plurality of rigid brace within a heel-shaped ring, said braces and heel-shaped ring dimensioned and shaped to allow said spikes to protrude into cavities bounded by said braces and heel membrane;

a generally rigid sole segment attached to said sole membrane, said sole segment having a plurality of rigid braces within a sole-shaped ring, said braces and sole-shaped ring dimensioned and shaped to allow said spikes to protrude into cavities bounded by said braces and sole membrane; and

said braces forming a combination of longitudinal, transversal and diagonal septi delineating said cavities.

4,872,274

REMOVABLE TOOTH WITH ADAPTER FOR DIGGING EXCAVATORS

Dieter Giersch, Glückstadt; Hans-Werner Rickmann, Witten, and Ulrich Wibbeling, Dortmund, all of Fed. Rep. of Germany, assignors to Hoesch Aktiengesellschaft, Dortmund, Fed. Rep. of Germany

Filed Sep. 15, 1988, Ser. No. 244,707

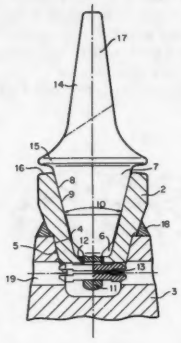
Claims priority, application Fed. Rep. of Germany, Sep. 18, 1987, 3731459

Int. Cl.[4] E02F *3/88, 9/28*

U.S. Cl. 37—64 **7 Claims**

7. A removable tooth with an adapter for a cutting wheel on suction dredges or power shovels, comprising: a cutting where; an adapter attached to the cutting wheel and having similarly shaped surfaces for supporting the tooth; said cutting wheel having a recess with a circumference and length of receiving said adapter; said adapter having a lateral outer surface in contact with said recess over the entire circumference of said recess and along at least part of the length of said recess; said adapter being fixed in said recess; said tooth having a base; said adapter having an opening for supporting said tooth on said base; said tooth extending with said base into said opening of said adapter and said adapter extending into said recess of said cutting wheel; and base of said tooth being shaped at least partly as a truncated cone, said adapter having a conical bore matching substantially said truncated cone, said

truncated cone resting in said matching conical bore, said bore comprising said opening in said adapter; said lateral surface of said adapter being shaped at least partly as a truncated cone, said recess in said cutting wheel having a conical shape matching substantially said truncated cone of said lateral surface, said lateral surface resting in said recess of said cutting wheel; said base having a bottom with a polygonal cross-section, said adapter having a rectangular recess engaging said polygonal



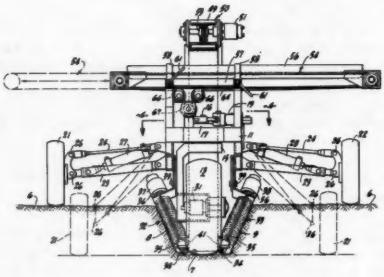
cross-section; a security element at said bottom of said base and extending through said base and through said adapter, said security element being accessible from outside through said cutting wheel; a collar on said tooth between said base and a predetermined point on said tooth, said collar having an outside diameter, said adapter having an outside diameter equal substantially to said outside diameter of said collar, said collar being positioned substantially above an upper edge of said adapter.

4,872,275

DITCH CLEANING MACHINE

Orval D. Beckett, deceased, late of Placerville, and by Berta M. Beckett, legal representative, 4125 McHenry Ave. - Space 121, Modesto, both of Calif. 95350

Filed May 20, 1988, Ser. No. 196,648
Int. Cl.[4] E02F *5/02*
U.S. Cl. 37—91 **5 Claims**



1. A ditch cleaning machine comprising a main frame extending longitudinally along an axis, a front ground-engaging wheel connected to the front of said main frame for pivoting about a first vertical axis, a rear ground-engaging wheel connected to the rear of said main frame for pivoting about a second vertical axis, a first outrigger wheel disposed on one side of said axis, a second outrigger wheel disposed on the other side of said axis, means for mounting said outrigger wheels on said main frame in transverse alignment and for vertical swinging movement relative to said main frame, a support roller, means for mounting said support roller on said frame for rotation about a transverse axis, an elevator frame extending longitudinally and resting on said roller, a pair of cleaning drum carriers, means for mounting both of said carriers at the top thereof for pivotal movement on said frame, cleaning drums rotatably mounted on said carriers, means for connecting both of said cleaning drum carriers at the bottom thereof to the lower end of said elevator frame for pivotal movement about a transverse axis, a jack pivoted to said frame and to said elevator frame for jackknifing both of said cleaning drum carriers with respect to said elevator frame, an elevator mounted on said elevator frame, a discharge conveyor frame, means for mounting said discharge conveyor frame for transverse shifting movement on said main frame, and a transverse conveyor mounted on said discharge conveyor frame.

4,872,276

CALENDERING PROCESS FOR POLYESTER FABRIC

Thomas E. Godfrey, Moore, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.

Filed May 13, 1988, Ser. No. 194,674
Int. Cl.[4] D06F *67/02*; B30B *3/04*
U.S. Cl. 38—101 **3 Claims**

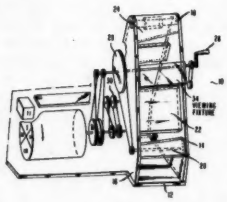
1. A method for treating a woven textile fabric comprised of polyester-containing yarns to decrease the bending recovery of said fabric, comprising passing said polyester-containing fabric between a pair of opposed calender rolls while maintaining the pressure exerted on said fabric by said rolls at a substantially uniform value, said valve being within the range of about 1,000 p.s.i. and 3,500 p.s.i., and maintaining said fabric at a temperature below about 150° F. while passing said fabric between said opposed rolls.

4,872,277

CALENDAR ASSEMBLY

Rao V. Angara, 156 Mineral Springs Ave., Passaic, N.J. 07055

Filed Aug. 18, 1987, Ser. No. 86,686
Int. Cl.[4] G01D *3/10*
U.S. Cl. 40—117 **9 Claims**



1. A hand held or self-supported calendar assembly comprised of:

a rotatable calendar year member consisting of fourteen different calendar year systems mounted coaxially or in

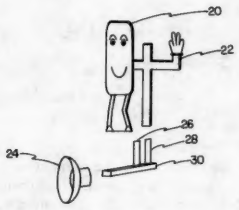
tandem with a rotating calendar indexing member furnishing an indexing system; and synchronized drive means for indexing a predetermined calendar year format to permit ascertaining the day of the week of any day of the month of said predetermined calendar year.

4,872,278

MOTION SENSITIVE ANIMATED FIGURE DISPLAY

Bruce E. Ross, and Gail C. Ross, both of 8 Kiska Ct., Randallstown, Md. 21133

Filed Apr. 26, 1988, Ser. No. 186,222
Int. Cl.[4] G09F *19/08*
U.S. Cl. 40—424 **2 Claims**



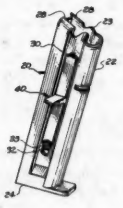
1. A motion sensitive animated figure display, comprising:
display means, comprised of separate display panels, for supporting different portions of said figure display,
attachment means, interconnecting the display panels to a support such that the display panels are in closely spaced vertical planes and whereby all portions of said figure display are animated,
wherein said attachment means are resilient and oscillating motion of the display panels is achieved,
means, for controlling and coordinating the oscillatory movement of each of said display panels with respect to each other, whereby the animation effect is enhanced,
mounting means for vertically supporting said figure display.

4,872,279

RELOADING DEVICE FOR CARTRIDGE MAGAZINE

John L. Boat, Phoenix, Ariz., assignor to John A. Norton, Phoenix, Ariz.

Filed Sep. 12, 1988, Ser. No. 242,883
Int. Cl.[4] F41C *27/00*
U.S. Cl. 42—90 **9 Claims**



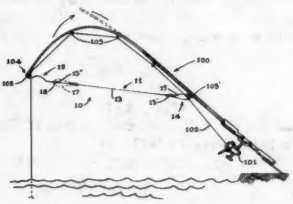
1. A reloading device for use in combination with a magazine, which magazine includes
an elongate tubular body having an open end for receiving and discharging cartridges therethrough,
an elongate slot extending longitudinally of said body, said slot having a first end proximate the open end of said body and a second end opposite said first end,
a follower reciprocally disposed within said body and having a retracting button projecting through said slot, and
biasing means normally urging said follower toward the open end of said body,
and for retaining said follower in a retracted position to facilitate insertion of cartridges into said magazine, said reloading device comprising:
(a) an elongate member including
(i) first means engageable with the first end of said slot, and
(ii) second means engageable with said follower;
wherein said elongate member resides in compression against said biasing means when said first means and said second means are engaged with said end of said slot and with said follower, respectively; and
(b) grip means carried by said member for manual manipulation of said device.

4,872,280

AUTOMATIC FISHHOOK SETTING DEVICE

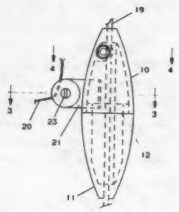
Benjamin L. Smith, 9950 Pine Park Ter., Colorado Springs, Colo. 80908

Filed Sep. 28, 1988, Ser. No. 250,051
Int. Cl.[4] A01K *91/06, 97/00*
U.S. Cl. 43—15 **3 Claims**



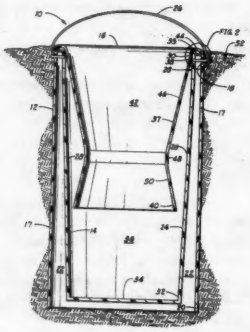
1. An automatic fishhook setting device for use in conjunction with a conventional fishing rod having a plurality of spaced eyelets and a rod tip having a tip eyelet wherein the device consists of:
a tether unit connected on one end to one of the spaced eyelets on the fishing rod; wherein, the tether unit comprises an elongated tether member having releasable attachment means for releasably securing said one end of the tether unit to one of the spaced eyelets on said fishing rod; and,
a spring release unit comprising a contoured leaf spring member which is releasably connected on one end to the rod tip eyelet and operatively attached on the other end to the tether unit wherein the contoured leaf spring member comprises: a shallow leaf spring hook segment formed on one end of said leaf spring member; a curved intermediate leaf spring segment formed as an extension of said shallow leaf spring segment; and, a generally flat leaf spring segment formed as an extension of the curved leaf spring segment; wherein, the shallow leaf spring segment and the curved intermediate leaf spring segment combine to form a generally S-shaped configuration on the forward portion of the contoured leaf spring member and the generally flat leaf spring segment is operatively connected to the other end of the tether unit whereby the only operative connection between the conventional fishing rod and the automatic fishook setting device occurs between the releasable attachment means on one end of the tether unit with a selected one of said plurality of spaced eyelets on the fishing rod, and the free end of the shallow leaf spring hook segment with the tip eyelet of the conventional fishing rod.

4,872,281
DOWNRIGGER FISHING LINE HOLDER
Billie J. Burgess, P.O. Box 492, Grand Haven, Mich. 49417
Filed Aug. 15, 1988, Ser. No. 231,899
Int. Cl.[4] A01K *97/00*
U.S. Cl. 43—43.12 **10 Claims**



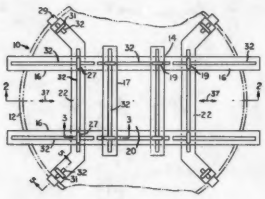
1. A line holder for a downrigger fishing system, comprising:
an elongated body having a slot along one side adapted to receive a downrigger cable;
releasable means forming a barrier across said slot, said barrier being spring-loaded plunger normally traversing, and withdrawable from, said slot; and
releasable clamping means on said body adjacent said slot, and operative to hold a fish line with a predetermined degree of resistance against pull-out.

4,872,282
ANT TRAP
Glen D. Caldwell, Rt. 1, Box 37, and Kenneth D. Craven, Rt. 1, Box 43, both of Byers, Okla. 74831
Filed Apr. 3, 1989, Ser. No. 331,911
Int. Cl.[4] A01M *1/10*
U.S. Cl. 43—121 **5 Claims**



1. An insect trap comprising:
an outer housing having an upper end and a lower end and an opening extending between the upper end and the lower end;
a container having an open upper end, a continuous side wall and a closed lower end, wherein the container is sized for insertion into the opening of the outer housing; and
a frusto-conical entrant lid having a smooth surface continuous side wall, wherein the smooth surface continuous side wall extends into the container, and wherein the smooth surface continuous side wall has an open upper end and an open lower end and an opening extending between the upper end and the lower end, and wherein a portion of the frusto-conical entrant lid adjacent the open upper end of the smooth surface continuous side wall is secured to and overlies the upper end of the container.

4,872,283
PLANT SUPPORT
William W. Yinger, 4200 Tartan Way, Roswell, Ga. 30075
Filed May 9, 1988, Ser. No. 191,540
Int. Cl.[4] A01G *9/12*
U.S. Cl. 47—70 **4 Claims**

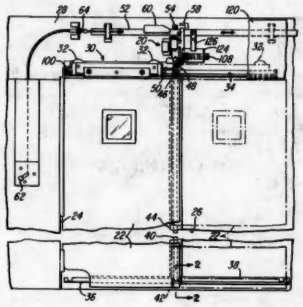


1. A support mechanism for the main stem area of a plant growing in a container; said mechanism comprising a ring structure adapted to encircle the plant stem area above the container rim; and means for detachably clamping the mechanism to the container rim;
said ring structure being defined by four horizontal bars arranged in a rectangular grip pattern; first and second ones of said bars being parallel to each other above the container rim, and third and fourth ones of said bars extending parallel to each other crosswise of the first and second bars so that sections of said first and second bars are in overlapping engagement with sections of the third and fourth bars; each bar having at least one elongated slot extending therealong;
a threaded connector means extending through each of the overlapped bar sections to connect the first and second bars to the third and fourth bars; each threaded connector means comprising a threaded element having a non-circular head and a threaded shank extended through the slots in the bars, and a clamping nut threaded onto the shank to releasably clamp the associated overlapped bar sections together;
the slots in the bars slidably receiving the threaded connector elements, whereby individual bars are capable of selective adjustments in directions normal to their length dimensions, to thereby permit variations in the size and location of the ring structure.

4,872,284
CELL BLOCK SECURITY SYSTEMS
Leroy Bentley, Covington, Ky., assignor to Stewart Decatur Security Systems, Inc., Erlanger, Ky.
Filed Nov. 17, 1988, Ser. No. 272,468
Int. Cl.[4] E05B *47/00*
U.S. Cl. 49—16 **10 Claims**

1. In a security system for a cell block wherein
each cell door is locked by a drop bar when it is disposed in a lower position and unlocked when the drop bar is in an elevated, release position, and the system comprises
a master control bar having means, effective in a lock position thereof, to lock all of the drop bars in their lower positions, and means, effective in an unlock position of the master control bar, to displace all of the drop bars to their release positions, and
selectively actuable, door unlocking means for raising each drop bar, said selectively actuable means being operable when the master control bar is in other than its lock or open positions, and comprising, in association with each cell,

means for latching the drop bar in its lower, locking position, and



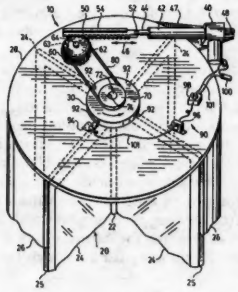
cam means for sequentially releasing said latch means and then raising the drop bar to its elevated, release position.

4,872,285

QUARTER POINT RETURN MECHANISM FOR MANUALLY OPERATED REVOLVING DOORS

Horst Appelmann, Pickering, Canada, assignor to C. J. Rush Inc., Agincourt, Canada

Continuation-in-part of Ser. No. 60,198, Jun. 10, 1987, Pat. No. 4,800,679. This application Jun. 2, 1988, Ser. No. 201,226
The portion of the term of this patent subsequent to Jan. 31, 2006, has been disclaimed.
Int. Cl.[4] E05D *15/02*
U.S. Cl. 49—42 **9 Claims**



1. A quarter point return mechanism for a manually driven revolving door having revolving door leaves extending outwardly from a central shaft and being partially enclosed between opposed curved side walls, said return mechanism comprising:

an actuator;

transmission means connecting said actuator to said central shaft, said transmission means transmitting rotation to said shaft when said actuator is actuated in a first direction and not transmitting rotation to said shaft when said actuator is actuated in a second direction; and

sensing means for sensing circumferential displacement of outer-ends of said door leaves from said side walls, said actuator being actuated in said first direction when said sensing means senses said outer ends of said door leaves are in a position circumferentially displaced from said side walls,

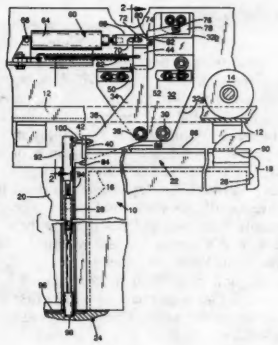
said return mechanism returning said door leaves to a rest position in which said door leaves are in contact with said side walls.

4,872,286

EXTERNAL LATCH STRUCTURE FOR LOCKING A DOOR IN DIFFERENT POSITIONS

Alfred J. Peirish, McMinnville; Theodore E. Schmidt, Carlton, and William C. Thomas, Beaverton, all of Oreg., assignors to Pacific Security Systems of America, Inc., Portland, Oreg.

Filed May 20, 1988, Ser. No. 196,249
Int. Cl.[4] E05D *13/04*
U.S. Cl. 49—449 **8 Claims**



1. In combination with a doorframe defining a door opening and a movable door mounted for movement between positions opening and closing said door opening, lock mechanism comprising:

a frame-carried locking member movably mounted on the doorframe for movement between a locking position and a release position where the door is located and released, respectively,

power-operated means operatively connected to and for moving the locking member between said locking and release positions,

a movable dead latch member mounted on the doorframe movable between a latching position latching the locking member in its locking position and an unlatching position where the locking member is free to move to its release position,

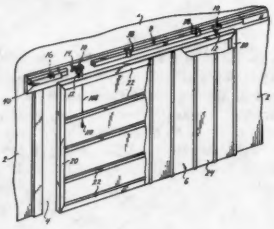
means for moving the dead latch member to its unlatching position,

a door-carried locking member shiftable between locking and release positions where the door is locked and released, respectively, said door-carried locking member being mounted on the door to be carried by the door,

said doorframe including a receptor for receiving the door-carried locking member with the door closed and the door-carried locking member in its locking position,

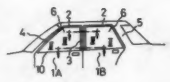
said frame-carried locking member including means engageable with the door-carried locking member with the door closed producing shifting of the door-carried locking member to a release position with movement of the frame-carried locking member to a release position.

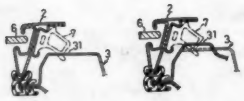
4,872,287
LATCHING MECHANISM FOR TROLLEY-HUNG DOORS
Gordon S. Block, Roscoe, Ill., assignor to C. Hager & Sons Hinge Manufacturing Company, St. Louis, Mo.
Filed May 13, 1988, Ser. No. 193,536
Int. Cl.[4] E05D *13/04*
U.S. Cl. 49—449 26 Claims



1. In combination with a track having a hollow interior, horizontal ways presented toward the hollow interior, and a downwardly presented slot between the ways; a trolley which rolls along the ways; and a hanger which is coupled to the trolley and extends through the downwardly presented slot along the ways for suspending a door or other device from the trolley and the track within which the trolley moves; an improved apparatus for holding the trolley in a predetermined position along the track, said apparatus comprising: a latch mechanism carried by the trolley substantially entirely within the hollow interior of the track and being movable on the trolley between first and second positions without projecting out of the track; and a keeper located within the hollow interior of the track and being attached to the track, the keeper being configured and positioned to be engaged by the latch mechanism when the latch mechanism is in its first position and the trolley is in the predetermined position along the track, but not when the latch mechanism is in its second position.

4,872,288
SEALING STRUCTURE FOR AUTOMOBILE
Masahiro Nozaki, Ama, Japan, assignor to Toyoda Gosei Co., Ltd., Nishikasugai, Japan
Filed May 26, 1988, Ser. No. 199,153
Claims priority, application Japan, Sep. 22, 1987, 62-144907[U]
Int. Cl.[4] E06B *7/76*
U.S. Cl. 49—485 3 Claims

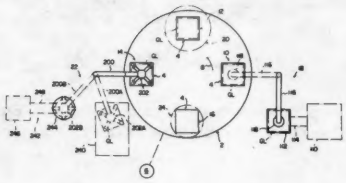




1. A sealing structure for sealing a gap between a door opening of an automobile body and a door frame by means of a weather strip, comprising:

said weather strip installed on one of a pillar defining said door opening, and said door frame opposed to said pillar for sealing a gap between said pillar and said door frame, has a quantity of flection, which is gradually increased upwards from a belt line of a door of said automobile body.

4,872,289
CUTTER
Isao Yukawa, Odawara, and Yasuji Tada, Yamato, both of Japan, assignors to Disco Abrasive Systems, Ltd., Tokyo, Japan
Filed Jun. 1, 1987, Ser. No. 55,978
Claims priority, application Japan, Jun. 10, 1986, 61-132655; Jan. 14, 1987, 62-5050
Int. Cl.[4] B24B *7/00*
U.S. Cl. 51—5 R 33 Claims



1. A cutter for cutting plate-like material along concentric circular inside and outside cutting lines, said cutter comprising:

a movably mounted supporting base stand,

at least two material-holding chuck means disposed on the supporting base stand, each chuck means including a chuck palte having a surface for holding material to be cut thereon, the chuck plate surface having two concentric annular grooves therein,

intermittently moving means for intermittently moving the support base stand, and sequentially positioning each chuck means in a cutting zone,

material carry-in means for carrying material to be cut to a chuck means located at a position in advance of the cutting zone,

a cutting blade device for cutting material held on a chuck means moved into the cutting zone, said blade device comprising rotatably-mounted, concentric inside and outside blades each of the blades having front end portions formed to be received within the concentric, annular grooves of the chuck plate surface, blade rotating means for rotating the inside and outside blades, and blade moving means for moving the inside and outside blades toward and away from the supporting base stand, and

material carry-out means for carrying cut material from a chuck means which has passed through the cutting zone.

4,872,290
GLASSWARE GRINDING AND/OR POLISHING APPARATUS
Margaret Jenkinson, Blackpool, England, and John Dunne, Dublin, Ireland, assignors to 501 Abbeybench Limited, Lancashire, England
Filed Dec. 24, 1986, Ser. No. 946,450
Claims priority, application United Kingdom, Dec. 24, 1985, 8531727
Int. Cl.[4] B24B *7/00*
U.S. Cl. 51—109 R 16 Claims

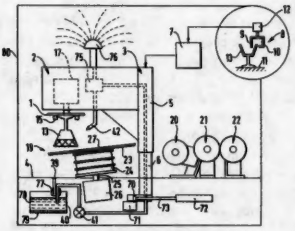
1. Apparatus for grinding and/or polishing glasses, comprising:

gripping means arranged to grip a glass;

at least one grinding means and at least one polishing means arranged to grind and polish the rim of a glass gripped in the gripping means; and

transport means arranged to cause relative movement between the gripping means and the grinding and polishing means;

wherein the grinding and polishing means each comprises an abrasive member having a resilient and substantially planar working surface disposed at such an angle that, during movement of the gripping means relative to the grinding and polishing means, the rim of a glass gripped in the gripping means travels over each said working surface from a first to a second region thereof, the second region being closer than the first region to the base of the glass.



4,872,291

MOUNTING DEVICE

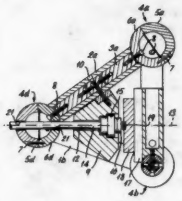
Kevin Lindsey, Sunbury-on-Thames, England, assignor to National Research Development Corporation, London, United Kingdom

Continuation of Ser. No. 84,851, Aug. 13, 1987, abandoned. This application Dec. 22, 1988, Ser. No. 289,433

Claims priority, application United Kingdom, Aug. 13, 1986, 8619699

Int. Cl.[4] B24B *41/02*

U.S. Cl. 51—166 R **18 Claims**



1. A mounting device comprising six rod-like members the ends of which are rigidly coupled together to form a substantially tetrahedral structure and mounting means comprising a rigid member fixedly coupled to three of said rod-like members, said three rod-like members not being co-planar.

4,872,292

FLAP WHEEL

Aleck Block, 800 Warner Ave., Los Angeles, Calif. 90024

Filed Jun. 22, 1988, Ser. No. 210,006

Int. Cl.[4] B24B *9/02*

U.S. Cl. 51—334 **52 Claims**

3. In combination for use in an array for engaging a workpiece,

a plurality of abrasive flaps each having first and second parallel surfaces and including a backing member and abrasive particles on the first surface of the backing member,

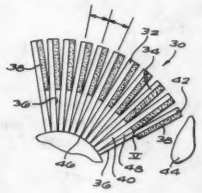
each of the abrasive flaps having a working portion and a support portion,

the abrasive particles being removed form the flaps in the packs at the support portions of the flaps,

the abrasive flaps being compressed against one another at the support portions of the flaps, and

an adhesive material disposed between the flaps at the support portions of the flaps,

wherein the abrasive particles on each abrasive flap have been attached by an adherent material to the support portion of the flap and wherein at least a portion of the adherent material remains on the support portion of the flap after removal of the abrasive particles from the flap and wherein additional adherent material is provided between the flaps in the support portions of the flaps and is adhered to the adherent material remaining on the flaps after the removal of the abrasive particles from the flaps.



4,872,293

ABRASIVE WATER JET CUTTING APPARATUS

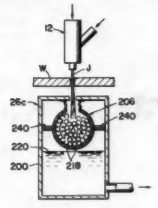
Wataru Yasukawa, deceased, late of Kobe (by Shigeko Yasukawa, sole heiress); Masanori Kiyoshige, Akashi; Takeshi Horikawa; Tomonobu Okada, both of Kobe; Tadafumi Ochi, Amagasaki; Yoshiaki Aoki, Osaka; Masahiko Higashida; Takashi Kawashima, both of Akashi; Shigeki Koe, Kobe; Hideo Ono, Takasago; Kanta Nihei, Kobe; Syunji Takasugi, Kobe, and Koji Take, Kobe, all of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Hyogo, Japan

Filed Feb. 20, 1987, Ser. No. 17,345

Claims priority, application Japan, Feb. 20, 1986, 61-36072; Apr. 18, 1986, 61-90398; Jul. 8, 1986, 61-161268; Jul. 8, 1986, 61-161269; Sep. 18, 1986, 61-143415[U]; Sep. 18, 1986, 61-143416[U]; Nov. 5, 1986, 61-264778

Int. Cl.[4] B24C *9/00*

U.S. Cl. 51—410 **3 Claims**



1. An apparatus for cutting work by means of an abrasive water jet containing abrasive particles, comprising:

(a) a source of water under pressure;

(b) abrasive suspension supply means for supplying an abrasive suspension such that abrasive particles with an average size of up to about 100 microns are held in suspension in water;

(c) an abrasive water jet nozzle assembly held opposite the work to be cut and communicating with both the pressurized water source and the abrasive suspension supply means, the nozzle assembly mixing the pressurized water and the abrasive suspension for directing the resulting mixture against the work as an abrasive water jet; and

(d) recovery vessel means for recovering, for transfer back to the abrasive suspension supply means, the abrasive water jet which has been discharged from the abrasive water jet nozzle assembly and which has cut the work, the recovery vessel means comprising:

(1) a recovery vessel positioned opposite the abrasive water jet nozzle assembly and having an inlet opening for admitting the abrasive water jet and at least one outlet opening for the discharge of the admitted water and abrasive particles;

(2) a multiplicity of damper balls of rigid material within the recovery vessel for damping the energy of the abrasive water jet;

(3) the recovery vessel having an inside surface which is at least partly rounded to allow the damper balls to be recirculated therein by the energy of the abrasive water jet;

(4) resilient means for resiliently supporting the recovery vessel;

(5) a watertight enclosure having mounted therein the recovery vessel and resilient means and having defined therein an inlet opening through which the abrasive water jet is admitted into the recovery vessel and an outlet opening in communication with the abrasive suspension supply means; and

(6) a bellows extending between the inlet opening in the watertight enclosure and the inlet opening in the recovery vessel.

4,872,294

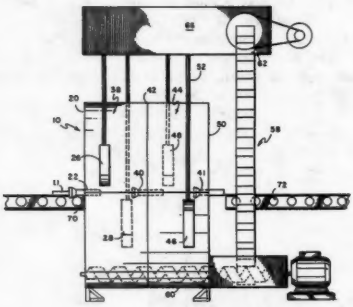
BAR AND COIL DESCALERS

W. David Watts, 4965 Hwy. 19 N., Alpharetta, Ga. 30201

Continuation-in-part of Ser. No. 824,460, Jan. 31, 1986, abandoned. This application Apr. 24, 1987, Ser. No. 42,464

Int. Cl.[4] B24C *3/14*

U.S. Cl. 51—420 **1 Claim**



1. An elongated bar-shaped workpiece cleaning device where workpieces are moved lengthwise on a path through said device from front to rear with a front conveyor carrying said workpieces to said device and a rear conveyor carrying said workpieces away from the rear of said device, comprising:

a casing having a front wall, a rear wall and four sides disposed at 45 degree angles to said path of said workpieces, two of said sides being upper sides and two of said sides being lower sides

a divider wall in said casing;

a first chamber, being approximately two feet in length, on one side of said divider wall between said divider wall and said front wall;

a second chamber, being approximately two feet in length, on the other side of said divider wall from said first chamber between said divider wall and said rear wall;

a first blast wheel to propel particles positioned on one of said upper side walls of said first chamber, said blast wheel having approximately a four-inch wide blast pattern;

a second blast wheel to propel particles positioned on an opposite lower side wall of said first chamber from said first blast wheel having approximately a four-inch wide blast pattern separated from said first blast wheel by an approximately four-inch wide air space defined therebetween, said first and second blast wheels mounted perpendicular to the direction of movement of said workpieces;

a third blast wheel to propel particles positioned on one of said upper side walls of said second chamber opposite from said wall in said first chamber having said first blast wheel said third blast wheel having approximately a four-inch wide blast pattern;

a fourth blast wheel to propel particles positioned on one os said lower side walls opposite said third blast wheel and on the opposite side wall of said second chamber from said side wall in said first chamber having said second blast wheel, said fourth blast wheel having approximately a four-inch wide blast pattern separated from said third blast wheel by an approximately four-inch wide air space defined therebetween and each of said third and fourth wheels mounted perpendicular to the direction of movement of said workpieces, the blast patterns of said first, second, third and fourth blast machines oriented perpendicular to the direction of movement of said workpieces;

a plurality of first bar guide tubes disposed in a horizontal parallel array in the front wall of said device, said bar guide tubes protruding approximately six inches into said first chamber, each of said bar guide tubes adapted to receive a workpiece to be cleaned therethrough, said first bar guide tubes adapted for said workpieces to be entered therein and pushed therethrough by said front conveyor, said particles to be propelled within said first chamber against said workpieces by said first and second blast wheels;

a plurality of second bar guide tubes each approximately twelve inches long disposed in a horizontal parallel array in said divider wall aligned with said first bar guide tubes, said second bar guide tubes extending from said divider wall approximately six inches into said first chamber and said second bar guide tubes extending from said divider wall approximately six inches into said second chamber through which said second bar guide tubes, said workpieces are passed into said second chamber where said workpieces have particles propelled thereagainst by said third and fourth blast wheels; and

a plurality of third bar guide tubes disposed in a horizontal parallel array in the rear wall of said casing aligned with said second bar guide tubes, said third bar guide tubes extending approximately six inches into said second chamber, said first, second and third bar guide tubes all being positioned beyond the blast patterns of said first, second, third and fourth blast wheels in said first and second chambers, said workpieces adapted to be lifted by the force of said particles from said fourth blast wheel to assist in aligning it with and to pass through said third bar guide tubes and exit said casing onto said rear conveyor which pulls said workpieces out of said casing.

4,872,295

ELECTRICALLY-OPERATED FOLDING STAGE SYSTEM

Kazuo Fujita, 1-1, Hagiyamadai, Seto-shi, Aichi-ken, Japan

Filed Jun. 27, 1988, Ser. No. 212,230

Claims priority, application Japan, Mar. 25, 1988, 63-72712

Int. Cl.[4] E04H *3/28*

U.S. Cl. 52—7 **8 Claims**

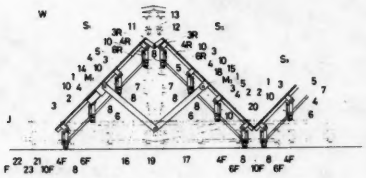
1. An electrically-operated folding stage system comprising

(a) at least a pair of stage components each including a platform,

(b) a means for pivotally connecting the stage components to each other,

(c) means for moving the stage components on a floor,

(d) a pair of opposed first and second geared motors mounted on the bottom of the platform of at least a first of the stage components for folding the stage components from horizontal positions to opposed vertical positions or unfolding the stage components from the vertical positions to the horizontal positions,
(e) each said geared motor being rotatable in either of two opposed directions,
(f) each said geared motor having a rotatable output shaft,
(g) a pair of opposed first and second link mechanisms,
(h) said first link mechanisms comprising a first link and a second link and said second link mechanism comprising a third link and a fourth link,
(i) said first link having one end fixed to said output shaft of said first geared motor,
(j) a first pivot means for pivotally connecting an opposed end of said first link and one end of said second link,
(k) a second pivot means for pivotally connecting an opposed end of said second link to the bottom of the platform of a second of the stage components,
(l) said third link having one end fixed to said output shaft of said second gear,
(m) a third pivot means for pivotally connecting an opposed end of said third link to one end of said fourth link,

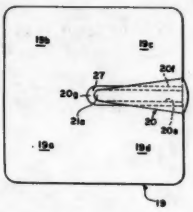


(n) a fourth pivot means for pivotally connecting an opposed end of said fourth link to the bottom of the platform of the second stage component,
(o) said links of each said link mechanism being in substantially horizontal positions when the stage components are in horizontal positions, but making upward articulating movements, about said first and third pivot means, to substantially vertical opposed positions when the associated geared motor is rotated in one of said two opposed directions, thereby moving or folding the stage components from said horizontal positions to opposed vertical positions,
(p) said links of each said link mechanism making downward articulating movements, about said first and third pivot means, from said substantially vertical opposed positions to said substantially horizontal positions when the associated geared motor is rotated in the other of said two opposed directions, thereby moving or unfolding the stage components from said opposed vertical positions to said horizontal positions, and
(q) said first and second geared motors and all of said links becoming included inside the stage components when the stage components are folded to said opposed vertical positions.

4,872,296
CORNER PIECES FOR SINGLE-PLY POLYMER-COATED FABRIC CORE ROOF MEMBRANES AND THE PRODUCT THEREBY FORMED

Albert S. Janni, Saginaw, Mich., assignor to Duro-Last Roofing, Inc., Saginaw, Mich.

Division of Ser. No. 79,586, Jul. 30, 1987, Pat. No. 4,799,086.
This application Dec. 19, 1988, Ser. No. 286,081
Int. Cl.[4] E04B *1/36*
U.S. Cl. 52—58 **2 Claims**

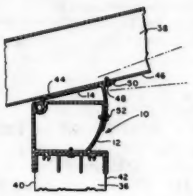


1. A corner piece for the integrated enclosure provided on a single-ply, thermoplastic, polymer-coated, fabric for roof membranes to cover large vertical structures projecting vertically from the roof which have vertical walls forming corners; the corner piece comprising a first generally rectangular membrane segment, a side being part-way split interjacent its ends and a second membrane segment with a triangularly-shaped corner portion conformed to loop shape and having its marginal edges overlying portions of the first segment contiguous to the split and being welded thereto in a continuous weld seam, the said triangularly-shaped corner portion having edges extending relative to one another from a radiused corner portion at an angle slightly less than 90°.

4,872,297
HEADER ASSEMBLY

Joseph R. Hetzel, Macedonia, and Kenneth L. Virgins, Hudson, both of Ohio, assignors to Patio Enclosures, Inc., Macedonia, Ohio

Filed Sep. 30, 1988, Ser. No. 251,515
Int. Cl.[4] E04B *7/06*
U.S. Cl. 52—92 **4 Claims**



1. Apparatus for attaching a roof panel to a side wall of an enclosure comprising a first elongated member having a base portion and a longitudinally extending portion having a longitudinally extending pocket formed therein, said base portion of said first elongated member having a configuration that conforms to the top of the side wall permitting the top of the side wall to be received therein for attachment thereto, said longitudinally extending portion of said first elongated member having a first portion substantially parallel to said base portion, a second portion substantially perpendicular to said first por-

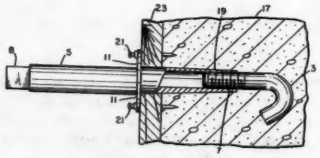
tion and joining one end of said first portion to one end of said base portion, and an arcuate portion oppositely disposed from said second portion and joining the other end of said first portion to said base member, said longitudinally extending pocket being positioned at the junction of said second portion with said one end of said first portion of said first elongated member, and a second elongated member for attachment to the roof panel, said second elongated member having a longitudinally extending yoke portion formed therein, said longitudinally extending yoke portion of said second elongated member being slidably receivable and rotatable within said longitudinally extending pocket within said first elongated member.

4,872,298

CONCRETE ANCHOR BOLT SETTING DEVICE

Frank Klemic, Jr., 11225 Hannum Ave., Culver City, Calif. 90230

Filed Feb. 12, 1988, Ser. No. 155,586
Int. Cl.[4] E04B *1/20, 1/41*
U.S. Cl. 52—127.1 **2 Claims**



1. A device for setting an anchor in place in concrete having a surface comprising:

an anchor which is substantially J-shaped, one end of which is threaded on its exterior surface, and a setting bolt comprising a durable and tapered metal bar having a hollow end with internal threads which mate with the threads on the anchor, wherein said anchor is set entirely below the surface of the concrete and wherein said metal bar is partially set below the surface of the concrete where said bar engages said anchor, and

means for securing said setting bolt to a first surface on one side of a frame having a second surface on an opposite side of the frame defining a form for pouring concrete, said setting bolt is partially inserted in a hole formed in said frame and mated with the anchor, wherein said means is defined by an annular plate fixedly coupled to said metal bar at a predetermined distance from said hollow end of said metal bar, said annular plate having a plurality of through openings formed therein for receiving fasteners to provide releasable coupling to said first surface of said frame, whereby said metal bar is removed to expose said threaded exterior surface of said anchor subsequent to solidification of said poured concrete.

4,872,299

KEY CLIP SUPPORT MEMBER

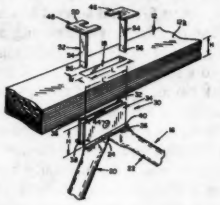
Arthur L. Troutner, and Kevin B. O'Sullivan, both of Boise, Id., assignors to Trus Joist Corporation

Filed Dec. 27, 1988, Ser. No. 290,686
Int. Cl.[4] F04C *3/12*
U.S. Cl. 52—693 **16 Claims**

1. A support member for use with a truss having upper and lower chords, wherein the chords have staggered recesses therein, each recess having a predetermined length and width and extending completely through the height of the chord, the truss further having diagonally extending web members with flattened ends overlapped within the support member, the web members extending between the chords to provide support thereto, wherein the support member comprises:

plural web cases located one in each said recess, each web case including a pair of opposed case elements one of which is positioned to each side of the adjacent flattened web member ends wherein each case element includes a planar side portion having an interior edge facing the opposing chord and a flange portion extending normally outwardly from said interior edge;

joining means for joining each of said web cases to adjacent web member ends; and



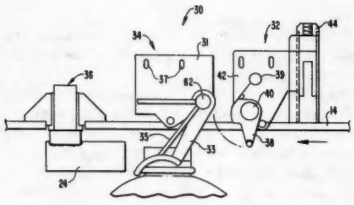
at least one case-retaining clip, having a substantially planar flange and a tab extending normal to said planar flange, said tab being sized in width to be clearance receivable in the width of one of the recesses and having a first portion of sufficient length to extend through the chord and having a second portion of sufficient length to secure said web case to the chord by bending of said second portion over said flange portion.

4,872,300

CAP DETECTOR FOR BOTTLING SYSTEM WITH HIGH SPEED GATE MECHANISM

James J. Luke, Bloomsburg, Pa., assignor to Frankandale Corporation, Berwyn, Ill.

Filed Aug. 26, 1988, Ser. No. 237,300
Int. Cl.[4] B65B *7/28;* B67B *3/26*
U.S. Cl. 53—53 **8 Claims**



1. A cap detection device for detecting a missing or cocked cap of a container in a production line, said device comprising:

a frame;

a conveyor coupled to said frame for transporting the containers through said device;

first detection means disposed above said conveyor for determining if one of the containers on said conveyor has a cocked cap;

second detection means disposed above said conveyor for determining if one of the containers on said conveyor has no cap; and

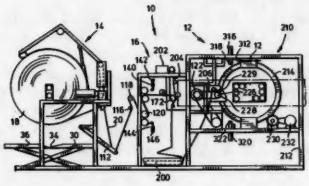
gate means for redirecting a container with a cocked cap or no cap off of the production line.

4,872,301

PACKAGING MACHINERY AND A METHOD OF MAKING A WRAP-AROUND SHIPPER PACKAGE

Marinus J. M. Langen, Toronto; Peter Guttinger, Rexdale, and Mihai M. Borza, North York, all of Canada, assignors to H. J. Langen & Sons Limited, Mississauga, Canada

Filed Jun. 13, 1988, Ser. No. 206,039
Int. Cl.[4] B65B 9/10, 61/18
U.S. Cl. 53—133 25 Claims



1. A packaging machine for wrapping a flexible web around an assembled load comprising:

(a) a wrapping station having an elongated web wrapping path extending therein along which a web is pulled from a web cutting station,

(b) a web dispenser means for dispensing a longitudinally elongated flexible web, in the direction of its longitudinal extent, along a web feeding path which extends to the web cutting station,

(c) a wrapping mandrel mounted in said wrapping station, said mandrel having a wrapping support face which has a longitudinal extent which extends transversely of said web wrapping path and a peripheral extent which extends in the direction of the wrapping path, said wrapping path extending around said wrapping support face, said mandrel having a load transfer passage opening therethrough, said load transfer passage extending transversely of said web wrapping path and having a discharge end opening toward a first side of said wrapping path, wrapper means mounted in said wrapping station for movement along said wrapping path,

(d) said wrapper means being operable to grasp a leading end of a first length of an elongated flexible web and to pull said leading end along the web wrapping path to locate said first length of web in a position extending around said support face of said wrapping mandrel with a marginal edge portion of the web projecting from the discharge end of the mandrel,

(e) web cutting means in said wrapping station for cutting the first length of web along a trailing edge thereof to separate the first length from the remainder of the web after it has been wrapped around the mandrel,

(f) folding means in the wrapping station for folding the leading and trailing ends of the web into an overlapping position on the mandrel to form a sleeve around the mandrel,

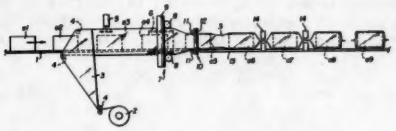
(g) discharge means for simultaneously discharging an accumulated load through the discharge end of the wrapping mandrel and stripping the sleeve from the mandrel such that the accumulated load is discharged into the sleeve and is transported laterally out of the wrapping path to an end closure mechanism.

4,872,302

METHOD OF, AND APPARATUS FOR, WRAPPING ARTICLES IN A PLASTIC FILM

Cornelis van Eijsden, Apeldoorn, and Jan C. Mersman, Rhenen, both of Netherlands, assignors to Borden BV, Apeldoorn, Netherlands

Filed Aug. 2, 1988, Ser. No. 227,340
Int. Cl.[4] B65B 11/12, 9/06, 53/00
U.S. Cl. 53—441 21 Claims



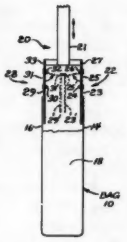
1. In a method of wrapping articles in a plastic film which is applied in tubular form around a unit of articles and thereafter subjected to a stretching and spring-back treatment to cause said film to contract tautly on to the unit being wrapped, the improvement comprising folding and connecting a stretch wrapping film supplied from at least one supply roll into the form of a tube with a cross-section sufficiently large to introduce a unit to be wrapped into such tube and transport it therein without the unit to be wrapped making contact with the tube wall, stretching the tube thus made in its longitudinal direction to such an extent as to cause said tube to constrict and contract tautly on to the unit being wrapped, closing the stretched and constructed tube in front of and behind the unit being wrapped and separating the stretched and constricted tube behind the unit being wrapped whereby the unit being wrapped is enveloped with tautly stretched film.

4,872,303

BAG TOP FORMING METHOD AND APPARATUS

Harold K. Johnson, Junction City, Kans., assignor to Mid America Machine Corp., Junction City, Kans.

Filed Feb. 25, 1988, Ser. No. 159,276
Int. Cl.[4] B65B 51/00, 7/06
U.S. Cl. 53—481 16 Claims



1. An apparatus for forming a top of a bag filled with a material, comprising:

means for conveying the filled bag to a forming location;

means for sensing when the filled bag is present at the forming location;

means for stopping the conveying means, the stopping means being responsive to the sensing means and being releasable;

means for forming the top of the filled bag into a substantially fin-like shape while the bag is stopped at the forming locations; and

means for releasing the stopping means when the top has been formed into the substantially fin-like shape;

wherein the means for forming the top of the filled bag

includes front and back flexible plates for flattening a front layer and a back layer of the bag.

4,872,304

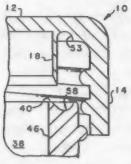
CLOSURE CAP WITH A SEAL AND METHOD OF AND APPARATUS FOR FORMING SUCH CLOSURE AND SEAL

Mortimer S. Thompson, Maumee, Ohio, assignor to Tri-Tech Systems International Inc., Maumee, Ohio

Continuation-in-part of Ser. No. 809,057, Dec. 12, 1985, Pat. No. 4,709,824, and a continuation-in-part of Ser. No. 809,058, Dec. 12, 1985, Pat. No. 4,708,255. This application Jun. 10, 1987, Ser. No. 61,304

Int. Cl.[4] B65D *53/00*

U.S. Cl. 53—487 **23 Claims**



19. A method of forming a cap including a linerless seal for a container having a neck comprising:

molding a cap from plastic having a top wall, and a depending wall within the cap comprising plastic and having an upper end extending from said top wall to a lower free end, and

engaging said lower free end with a substantially concave surface in the rim of the container neck as the cap is placed and closed on the container neck to progressively curl said free end as it moves along said substantially concave surface away from said inner depending wall and from said substantially concave surface while stretching and softening the curled portion of said free end in contact with said substantially concave surface of the neck of the container, to thereby form a stretched softened curled free end, and

continuing to close the cap on the container neck whereupon the stretched softened curled free end of the curl is compressed and placed in sealing engagement with said substantially concave surface of the neck of the container.

4,872,305

PROCESS FOR THE AUTOMATIC PRODUCTION OF ORNAMENTAL LINK CHAINS AND RELATIVE APPARATUS

Corrado Lapini, Civitella Val di Chiana, and Franco Esposito, Arezzo, both of Italy, assignors to Costruzione Macchine Speciali C.M.S. srl, Arezzo, Italy

Continuation of Ser. No. 16,357, Feb. 19, 1987, abandoned. This application Sep. 12, 1988, Ser. No. 244,629

Claims priority, application Italy, Feb. 28, 1986, 9343 A/86

Int. Cl.[4] B21L *3/00*

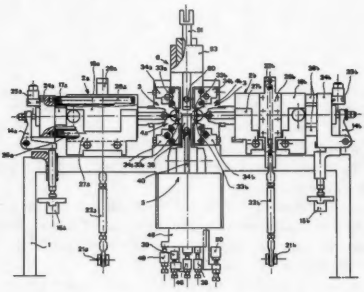
U.S. Cl. 59—18 **8 Claims**

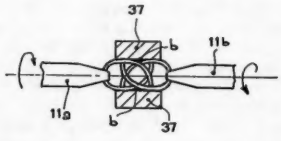
1. An apparatus for the production of ornamental chains from links, each said link being formed of a pair of link elements, each said link element having the shape of a turn of a spiral with free ends, said apparatus comprising:

two pairs of vices suitable for grasping and holding two of said link elements, respectively, one of said link elements being already engaged in the last link of the chain already formed by means of one of said free ends, said pair of vices defining a respective axial direction;

motion means connected to said pairs of vices for providing said pairs of vices with a relative translation motion along said respective axial direction in order to bring into engagement one with the other said two link elements grasped by said two pairs of vices, until said free ends of a first of said two link elements are brought up to about the center of the other of said two link elements, and for providing a simultaneous angular motion about an axis parallel to said axial direction to arrange said two link elements into two planes each containing said axis and offset from each other by an angle not greater then 90° before said engagement, with a relative angularly-opposed motion to contact respective opposing edges of said two link elements, to thereby link said two link elements to form a link of said chain, said motion means adapted to move said pairs of vices between a first working position and a second working position;

shaping means for being positioned around the link constituted by the union of said two link elements and between said two pairs of vices transverse to said axial direction and adjacent the second working position, and for shaping the link by compressing said two link elements both in a transversal and orthogonal direction with respect to a plane of the link, for sliding said free ends of the link elements one on the other, crossing them over until said





free ends of each one are bought against respective internal contours of the other, said vice pairs being provided with a further rotational motion to twist said two link elements relatively in opposite directions one to the other about an axis parallel to said axial direction, while said link is still held in said shaping means, as part of the shaping of each said link; and

means for making further ones of said link elements available two-by-two to said pair of vices, respectively, and for providing the coupling of one of them to the last link formed, said means for making being disposed adjacent to the first working position;

wherein said two pairs of vices are further integrally provided by said motion means with a translatory motion, so as to move between the first working position in which said grasping of each respective pair of said link elements occurs and said coupling of the last-formed link with a respective link element of the link to be subsequently formed is performed and the second working position in which the linking of said link elements and the shaping of the link is carried out; and

wherein said shaping means includes a pair of clamps which

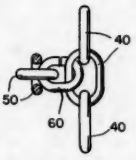
operate to shape the respective link when said pair of vices is in said second working position.

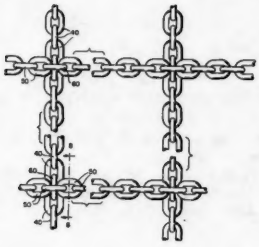
4,872,306

METHOD OF FABRICATING CHAIN MESH AND CHAIN MESH FABRICATED THEREBY

Gerald H. Ensminger, Dallastown, and Andrzej Kalazny, Wyomissing, both of Pa., assignors to Cooper Industries, Inc., Houston, Tex.

Division of Ser. No. 77,623, Jul. 24, 1987. This application Feb. 23, 1988, Ser. No. 159,385
Int. Cl.[4] F16G *13/12*
U.S. Cl. 59—78 2 Claims





1. A chain mesh, comprising:

a plurality of running lengths of chain, the running lengths being so positioned that at least a first running length crosses and is adjacent to a second running length at a crossing site, said running lengths being disposed in different planes in overlapping relationship with one another at least at the crossing site; and

separate connecting means between and connected to both the first and second running lengths at the crossing site so as to flexibly maintain the first and second running lengths in close but spatially separate relationship to one another at the crossing site, said connecting means comprising a short length of chain having a link at each end engaged in a respective link of the first and second running lengths.

4,872,307

RETROFIT OF SIMPLE CYCLE GAS TURBINES FOR COMPRESSED AIR ENERGY STORAGE APPLICATION

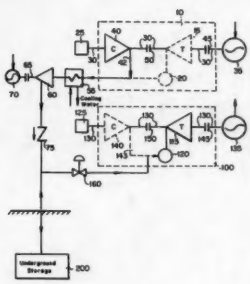
Michael Nakhamkin, Mountainside, N.J., assignor to Gibbs & Hill, Inc., New York, N.Y.

Filed May 13, 1987, Ser. No. 49,650
Int. Cl.[4] F02C *6/16*
U.S. Cl. 60—39.02 22 Claims

1. In a gas turbine power plant of the type in which first and second gas turbine engines are each used to produce power, each of said engines comprising an air compressor, a turbine element and a combustor, the improvement comprising the steps of:

deblading said turbine element of said first gas turbine engine;

coupling an additional compressor to said first gas turbine engine, said additional compressor having a compressed air input connected to a compressed air output of said compressor of said first gas turbine engine and a compressed air output connected to an air storage device;



coupling to said additional compressor and said compressor of said first gas turbine engine means for driving them;

deblading said compressor of said second gas turbine engine; and

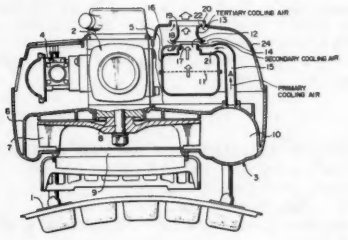
providing compressed air from said air storage device to said turbine element of said second gas turbine engine instead of said compressor of said second gas turbine engine.

4,872,308

EXHAUST DEVICE FOR WORKING MACHINE

Noboru Nagai, Hachioji; Yoshisato Hashimoto; Yoshihiko Tsuboike, both of Tokyo, and Noboru Kaito, Koganei, all of Japan, assignors to Kioritz Corporation, Tokyo, Japan

Filed Jun. 8, 1988, Ser. No. 204,124
Claims priority, application Japan, Jun. 18, 1987, 62-93630[U]
Int. Cl.[4] F02B *35/00;* F01N *3/02*
U.S. Cl. 60—316 2 Claims



1. An exhaust device for a working machine comprising:

an internal combustion engine mounted as a power source;

a muffler connected to said internal combustion engine for discharging exhaust gas delivered from the internal combustion engine while damping its sound, said muffler having an outlet opening;

a blower driven by said internal combustion engine;

a mixing tubular member disposed opposite to the outlet opening of the muffler through a space interposed between the tubular member and the muffler; and

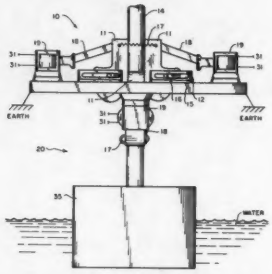
an air-flow passage for introducing a portion of pressurized air from said blower into the inside of an annular air guide wall on the outer periphery of said outlet opening in a tangential direction.

4,872,309

PHASE CONTROL MECHANISM FOR WAVE ENERGY CONVERSION

Paul N. Jaenichen, Sr., Newport News, Va., assignor to The The United States of Americas as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 7, 1988, Ser. No. 280,869
Int. Cl.[4] F03B *13/14*
U.S. Cl. 60—497 7 Claims



1. In a wave energy conversion apparatus of the type having a drive shaft reciprocable by means of a buoyant body, a cam brake locking mechanism, comprising:

(a) a supporting bracket affixedly mounted on said sea wave conversion apparatus said bracket adjacent said reciprocable drive shaft;

(b) a locking cam having a shaft engaging surface suitable for frictionally contacting said reciprocable drive shaft, said locking cam pivotally mounted on said supporting bracket and oriented to contact said reciprocable drive shaft with said shaft engaging surface;

(c) a spring adapted to urge said shaft engaging surface into frictional contact with said reciprocable drive shaft preventing relative motion of said reciprocable drive shaft in a singular direction within said sea wave energy conversion apparatus; and,

(d) an electrical solenoid pivotally linked with said locking cam; whereby, when said electrical solenoid is energized, said locking cam is disengaged from frictional contact with said reciprocable drive shaft allowing said drive shaft to freely move within said sea wave energy conversion apparatus.

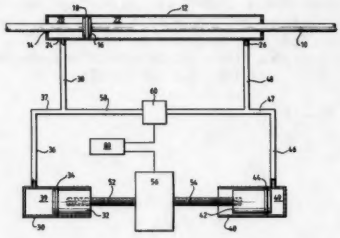
4,872,310

ELECTRO-HYDRAULIC ACTUATOR ASSEMBLY

Arthur Kaye, Freckleton, United Kingdom, assignor to British Aerospace, PLC, London, England

Filed Dec. 14, 1987, Ser. No. 132,339
Claims priority, application United Kingdom, Dec. 12, 1986, 8629750
Int. Cl.[4] B60T *7/00*
U.S. Cl. 60—567 9 Claims

1. An electro-hydraulic actuator assembly, comprising a rotary actuator, master piston-and-cylinder means connected to said rotary actuator and having two hydraulic fluid delivery ports, a slave piston-and-cylinder having inlets disposed on opposite sides of the piston thereof and being hydraulically connected to said ports by way of respective fluid flow paths, the slave piston being mechanically coupled to an output member, the position of which it is desired to control, and override means for overriding automatic control of the slave piston-and-cylinder, said override means including a by-pass duct connected between said flow paths, and an electrically operable valve means connected in said by-pass duct such that when said valve means is opened hydraulic pressure on two sides of the slave piston is equalized, whereby control of the position of said output member is decoupled from said rotary actuator, said valve means having a control input connected to an output of controller means which has input means for connection to first and second position signalling means for respectively providing signals from said output member and said actuator,



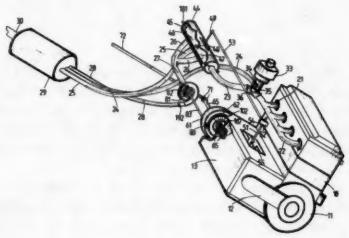
the controller means being responsive to any difference between said signals so as to de-energize said valve means and thereby to effect decoupling until said difference is eliminated, whereupon the controller means is effective to cause said valve means to be energized.

4,872,311

EXHAUST GAS TURBINE CONNECTED TO ENGINE OUTPUT

Michael Sturm, Klappengasse 55, 6707 Schifferstadt, Fed. Rep. of Germany

Filed May 19, 1988, Ser. No. 196,160
Int. Cl.[4] F02B *41/10*
U.S. Cl. 60—615 1 Claim



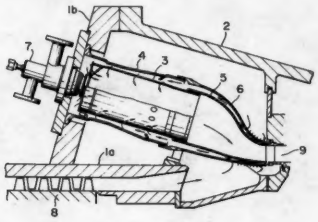
1. Motor combustion engine having a turbo compound system for improving the performance of the engine, comprising: casing means for receiving engine exhaust gases and having a plurality of outlets for discharging the exhaust gases, an exhaust-gas-driven turbine means having an inlet connected to certain of the casing means outlets, said turbine means having a driving shaft, an output shaft, variable-speed transmission means connecting the output shaft to be driven by the engine and including a control, a hydraulic clutch having a first part idling on the output shaft and a second part fixed to the output shaft, gear means drivingly connecting the turbine means driving shaft to the first part of the hydraulic clutch, by-pass means connected to other of the casing means outlets, and control means for selectively opening and closing the casing outlets to vary the transmission of exhaust gases to the turbine means, said control means for the casing means being connected to the control for the transmission means.

4,872,312

GAS TURBINE COMBUSTION APPARATUS

Nobuyuki Iizuka, Hitachi; Kazuhiko Kumata, Katsuta, and Michio Kuroda, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 19, 1987, Ser. No. 27,730
Claims priority, application Japan, Mar. 20, 1986, 61-60575
Int. Cl.[4] F23R *3/54, 3/06*
U.S. Cl. 60—760 1 Claim



1. A gas turbine combustor apparatus comprising:

a cylindrical combustor liner having an outer wall in which cooling air holes are formed;

a fuel nozzle provided at a head of said combustor liner;

a tail pipe connected to an end of said combustion liner for introducing combustion gas, produced within said combustor liner, into a turbine portion;

a flow sleeve having a length substantially equal to said connected combustor liner and tail pipe and surrounding substantially over the full length of said connected combustor liner and tail pipe, with a radial gap between said flow sleeve and said connected combustor liner and tail pipe; and

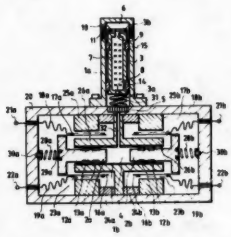
means for introducing cooling air into the gap between said flow sleeve and said tail pipe, said cooling air introducing means having a group of small holes formed in a first region of said flow sleeve close to said turbine portion, wherein said flow sleeve has a second region closer to said combustor liner than said frost region of the small holes, through holes being formed in said second region for introducing the cooling air.

4,872,313

GAS CYCLE MACHINE

Yoshio Kazumoto; Takuya Suganami; Yoshiro Furuishi, and Kazuo Kashiwamura, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 2, 1988, Ser. No. 239,822
Claims priority, application Japan, Sep. 4, 1987, 221342/1987
Int. Cl.[4] F25B *9/00*
U.S. Cl. 62—6 4 Claims



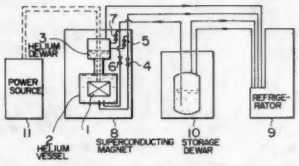
1. A gas cycle machine, comprising: permanent magnet means (24), a first moving coil (17*a*) disposed in a first gap (23*a*) through which magnetic flux from said permanent magnet means passes in a first direction, a second moving coil (17*b*) disposed in a second gap (23*b*) through which magnetic flux from said permanent magnet means passes in a second direction opposite to said first direction, a first piston (2*a*) connected to said first moving coil, a second piston (2*b*) connected to said second moving coil, a compression space (4) defined between said first and said second pistons, a working gas disposed in said compression space such that when an alternating current is supplied to said first and second moving coils, alternating compression and expansion of said working gas is produced in said compression space, and means defining a working gas ingress and egress passage (32) between said compression space and a utilization device.

4,872,314

SUPERCONDUCTING COIL REFRIGERATING METHOD AND SUPERCONDUCTING APPARATUS

Katuhiko Asano, Hitachi, and Takao Suzuki, Mito, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 7, 1988, Ser. No. 280,966
Claims priority, application Japan, Dec. 7, 1987, 62-307559
Int. Cl.[4] F17C *13/02*
U.S. Cl. 62—49.1 7 Claims



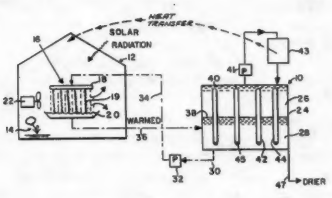
1. A superconducting coil refrigerating method in which a superconducting coil immersed in liquid helium in a helium vessel is refrigerated by producing a flow of liquid helium in said helium vessel at at least one of a specified time upon change of a current of said superconducting coil, a specified time before the current change and a specified time after the current change.

4,872,315

HEAT EXCHANGER AND SYSTEMS AND METHODS FOR USING THE SAME

Gad Assaf, Rehovot, Israel, assignor to Geophysical Engineering Company, Seattle, Wash.

Division of Ser. No. 798,841, Nov. 18, 1985, Pat. No. 4,745,963, which is a division of Ser. No. 558,436, Dec. 6, 1983, Pat. No. 4,583,370. This application Jan. 26, 1988, Ser. No. 148,709
Int. Cl.[4] F25B *17/10;* F24J *2/30*
U.S. Cl. 62—94 7 Claims



1. A method for conditioning air in an enclosure comprising the steps of:

(a) contacting the air in the enclosure during the day with concentrated brine to cool and dry the air as the brine is heated by absorption of sensible heat from the air and the absorption of latent heat of condensation as vapor in the air condenses on the brine;

(b) transferring heat absorbed by the contacted brine to another fluid whereby the transferred heat is temporarily stored in the other fluid; and

(c) returning to the air in the enclosure at night, the heat stored in said other fluid.

4,872,316

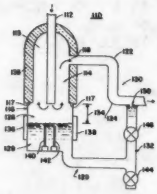
SYSTEM FOR MONITORING A LIQUID ENTRAINED IN A FLUID

Fredrick D. Browne, Somerville, and Jacob H. Martin, Wellesley, both of Mass., assignors to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.

Filed Feb. 1, 1988, Ser. No. 151,071

Int. Cl.[4] F25B *49/00, 43/02*

U.S. Cl. 62—129 **18 Claims**



14. A monitoring system, for use within a closed refrigeration system including a compressor, a condenser and evaporator, for detecting contamination of a lubricant entrained in a refrigerant circulating through the refrigeration system, said monitoring system comprising:

a housing having an inlet for receiving the refrigerant, a reservoir for containing extracted lubricant, and an outlet portion disposed in predetermined relationship with said reservoir for venting the refrigerant to the remainder of the refrigeration system;

a conduit extending through said inlet and into said housing, below said outlet portion, for directing the circulating refrigerant in a curved path past said reservoir to create a centrifugal force which separates the lubricant from the refrigerant and directs the lubricant into said reservoir; and

probe means, disposed in said reservoir, for measuring an electrical parameter representative of the electrical resistance of the lubricant to detect a change in resistivity indicative of contamination of the lubricant.

4,872,317

UNITARY ICE MAKER WITH FRESH FOOD COMPARTMENT AND CONTROL SYSTEM THEREFOR

William A. Reed, Cedarburg, Wis., assignor to U-Line Corporation, Milwaukee, Wis.

Filed Oct. 24, 1988, Ser. No. 261,801

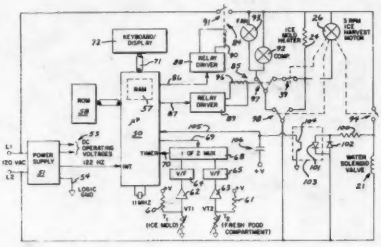
Int. Cl.[4] F25C *1/00*

U.S. Cl. 62—135 **8 Claims**

1. In a unitary ice maker with fresh food compartment of the type including a fresh food compartment, a freezer compartment containing an automatic ice making unit, the automatic ice making unit including an ice mold, a first temperature sensing means in thermal contact with the ice mold for producing a first signal indicative of the temperature of the ice mold, and means for harvesting ice from the ice mold, and refrigeration means for producing ice in the automatic ice making unit, the improvement wherein the unitary ice maker with fresh food compartment further comprises:

second temperature sensing means exposed to the fresh food compartment for producing a second temperature signal indicative of the temperature of the interior of the fresh food compartment;

ice maker control means connected to the refrigeration means and to the first and second temperature signals for initiating an ice harvest in the automatic ice making unit by monitoring the first temperature signal to determine



the time at which ice in the automatic ice making unit is ready to be harvested, and at that time, then monitoring the second temperature signal to determine if the temperature of the fresh food compartment is below a predetermined setpoint temperature, whereby if at the time that the ice in the automatic ice making unit is ready to be harvested, the temperature of the fresh food compartment is above the setpoint temperature, then the ice harvest is delayed to allow additional cooling of the fresh food compartment.

4,872,318

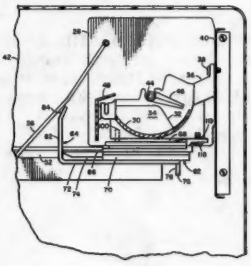
SHUT-OFF MECHANISM FOR ICE MAKER

Ramon L. Klemmensen, Cedar Rapids, Iowa, assignor to Amana Refrigeration, Inc., Amana, Iowa

Filed Nov. 18, 1988, Ser. No. 272,843

Int. Cl.[4] F25C *5/18*

U.S. Cl. 62—137 **6 Claims**



3. In a freezer compartment of a household refrigerator, the combination comprising:

a removable ice container;

an automatic ice maker positioned for periodically dumping a load of ice into said ice container, said ice maker having a feeler arm for sensing the level of ice in said container and shutting off said ice maker in response to ice being above a predetermined level; and

means for urging said feeler arm to a position shutting off said automatic ice maker when said ice container is absent wherein said urging means comprises a case secured to said ice maker and a plunger member, said case having a

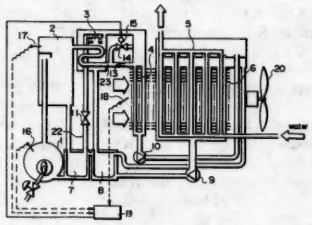
longitudinal bore receiving said plunger member and a spring resiliently pushing said plunger member, said plunger member having a plate adapted for engaging said ice storage bin wherein, when said ice storage bin is present in said freezer compartment, said plunger member is held in a first position within said bore and, when said ice storage bin is absent from said freezer compartment, said spring pushes said plunger member outwardly against said feeler arm so that said feeler arm is urged to said position shutting off said ice maker.

4,872,319

AIR-COOLED ABSORPTION TYPE COOLING/HEATING WATER GENERATING APPARATUS

Shinji Tongu, Shizuoka, Japan, assignor to Yazaki Corporation, Tokyo, Japan

Filed Jun. 28, 1988, Ser. No. 212,617
Claims priority, application Japan, Nov. 19, 1987, 62-292660
Int. Cl.[4] F25B *15/00*
U.S. Cl. 62—141 **4 Claims**



1. An air-cooled absorption type cooling/heating water generating apparatus comprising:

means for evaporating a refrigerant and absorbing the evaporated refrigerant in a solution and removing heat from the refrigerant-absorbed solution by cooling with ambient air;

high-temperature regenerating means for heating said refrigerant-absorbed solution;

means for separating said heated refrigerant-absorbed solution into the refrigerant and the solution;

low-temperature regenerating means for subjecting said refrigerant separated in vapor form to heat exchange;

a condenser for condensing said refrigerant vapor;

pump means for circulating said refrigerant-absorbed solution and said condensed refrigerant;

a heat exchanger for subjecting said heat-removed refrigerant-absorbed solution to heat exchange before said refrigerant-absorbed solution is fed into said high-temperature regenerating means and said separating means and also subjecting said separated solution to heat exchange before said separated solution is returned to said refrigerant absorbing and heat removing means;

flow rate regulating means disposed in a solution conduit extending between said heat exchanger and said low-temperature regenerating means, said flow rate regulating means being a constant flow rate control valve which controls the flow rate of said solution on the basis of the result of detection of an internal pressure difference between said separating means and said low-temperature regenerating means to provide for solution flow through said solution conduit at a predetermined flow rate; and

pressure regulating means disposed in an evaporated refrigerant conduit extending between said separating means and said condenser, said pressure regulating means being a primary pressure regulating valve whose valve opening is increased when internal pressure of said separating means exceeds a predetermined pressure value,

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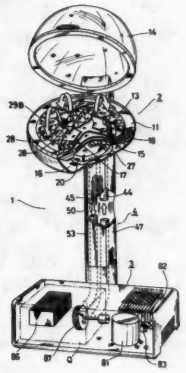
4,872,320

REFRIGERATION SHOWCASE

Yoshirou Ishizaka, Ora; Hiroshi Naganuma, Oizumi; Kenji Sato; Yuji Kishi, both of Ohta; Yoshihisa Ishida, and Kiyokazu Goto, both of Oizumi, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Dec. 7, 1988, Ser. No. 281,268
Claims priority, application Japan, Dec. 11, 1987, 62-314982; Feb. 3, 1988, 63-24585; Apr. 7, 1988, 63-86821; Apr. 20, 1988, 63-97310; May 26, 1988, 63-129060; Jun. 7, 1988, 63-140183
Int. Cl.[4] A47F *3/04*
U.S. Cl. 62—255 **24 Claims**



1. A refrigeration showcase comprising a display case for displaying commodities while refrigerating the commodities, a machine case disposed at a position away from the display case, and an air duct connecting the display case to the machine case in communication therewith,

the display case comprising a display table for displaying the commodities as placed thereon, a cover member openably covering the display table from above to define a commodity chamber above the display table and permitting the commodity chamber to be seen therethrough from outside, and an air passage member disposed under the display table and providing a cold air supply portion for supplying cold air therethrough to the commodity chamber and a cold air discharge portion independent of the supply portion for discharging cold air from the commodity chamber therethrough,

the machine case comprising a case body, a refrigerator housed in the case body and providing a refrigeration cycle comprising a compressor, condenser, pressure reducing means and evaporator, and a cold air circulating blower housed in the case body for supplying air cooled by the evaporator in circulation,

the air duct having a forward air channel for transporting the cold air cooled by the evaporator therethrough to the cold air supply portion, and a return air channel independent of the forward air channel for transporting cold air from the cold air discharge portion to the evaporator therethrough.

4,872,321

NONIMMERSIVE CRYOGENIC COOLER

Scott Buchanan, San Diego, Calif., assignor to Biomagnetic Technologies, Inc., San Diego, Calif.

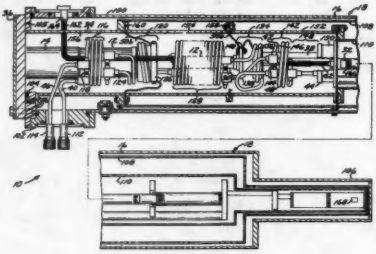
Filed Apr. 27, 1988, Ser. No. 187,016
Int. Cl.[4] F25B *19/00*
U.S. Cl. 62—51.1 **18 Claims**

1. Apparatus for attaining cryogenic temperatures within its interior, comprising:

an elongated container having insulated walls, one closed end, and an endplate covering the open end of the container;

a mechanical precooler supported within the container by a first support joined to the endplate;

a gas expansion nozzle supported within the container by a second support joined to the endplate;



a gas supply line extending to the gas expansion nozzle from the endplate, the supply line including a first length of supply line contacting and precooled by the mechanical precooler and a second length of supply line connected to the nozzle; and

a flexible supply coupling between the first length of supply line and the second length of supply line.

4,872,322

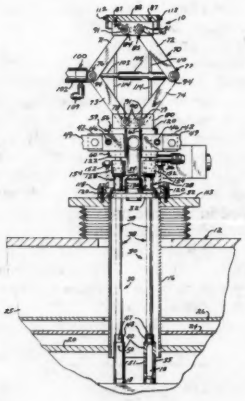
POWER OPERATED CONTACT APPARATUS FOR SUPERCONDUCTIVE CIRCUIT

Daniel C. Woods, Florence, S.C., and Kenneth R. Efferson, Oak Ridge, Tenn., assignors to General Electric Company, Milwaukee, Wis.

Filed Sep. 2, 1988, Ser. No. 239,811

Int. Cl.[4] F25B *19/00*

U.S. Cl. 62—51.1 **9 Claims**



1. A power operated contact apparatus for extending and retracting one or more electrical leads into and out of a cryostat for making and breaking, at a cryogenic temperature, electrical contact with a superconductive circuit, comprising:

at least one rigid elongated lead for extending into a cold space of the cryostat which is at or near a cryogenic temperature, said lead having an inner end and a outer end;

a connector fixed at the inner end of the lead for making electrical contact in the cold space with a connector of the superconductive circuit;

guide means journaling said lead for allowing said lead to move axially relative to the guide means and sealing against said lead;

a foundation for sealed attachment to the cryostat and to the guide means so that the connector on the inner end of the lead is extendable into making electrical contact with the connector of the superconductive circuit in the cold space;

power operated means mounted on the foundation and fixed to the outer end of the lead for extending and retracting the lead to and from making electrical contact with the superconductive circuit in the cold space; and

means for de-icing the exterior of the leads and guide means when the leads are connected to the superconducting circuit.

4,872,323

APPARATUS FOR LAYING TRANSVERSE WEFT THREADS FOR A WARP KNITTING MACHINE

Roland Wunner, Schwarzenbach/Wald, Fed. Rep. of Germany, assignor to LIBA Maschinenfabrik GmbH, Fed. Rep. of Germany

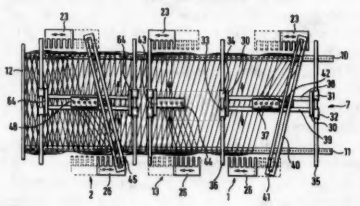
Continuation of Ser. No. 860,699, May 5, 1980, Pat. No. 4,677,831, which is a continuation of Ser. No. 674,648, Nov. 26, 1984, abandoned. This application Jul. 6, 1987, Ser. No. 70,013

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1983, 3343048

The portion of the term of this patent subsequent to Jul. 7, 2006, has been disclaimed.

Int. Cl.[4] D04B *23/06*

U.S. Cl. 66—84 A **8 Claims**



1. A weft thread laying apparatus for warp knitting machines having a needle bed and two spaced apart longitudinal conveyors for continuously conveying weft threads in a given direction to the needle bed, the apparatus comprising:

first and second carriages reciprocally movable between said two longitudinal conveyors in a substantially transverse direction to the movement of said conveyors, with said second carriage spaced from said first carriage and located intermediate said needle bed and said first carriage;

first and second thread laying guides carried on said first and second carriages, respectively, and adapted for movement in a direction relative to the direction of movement of said conveyors to lay a first and a second plurality of parallel weft threads between said conveyors;

first and second runway rails cooperating with said first and second thread laying guides, respectively, to guide the same in a given reciprocal path between said opposed conveyors; and

first and second guide rails being movable relative to the direction of movment of said conveyors to cause said thread laying guides to lay said plurality of first and second weft threads at an angle of 20° or greater as viewed transversely to the direction of travel of said conveyors;

a pair of displacement combs for each of said first and second thread laying guides, with each comb of said pair located outwardly adjacent each of the opposed conveyors and adapted to pick the plurality of weft threads from said thread laying guide substantially at the location where said thread guide carried by said thread carriage passes over one conveyor, reverse direction, and moves in that angular reciprocal path determined by said rail toward said other conveyor;

each comb of said pair movable in a reciprocable path parallel to said conveyors that distance necessary for said thread guide to lay successive widths of a given plurality of weft threads in parallel onto its respective conveyor;

wherein each of said combs receives a given plurality of parallel weft threads from said thread guide, locates the same on the respective adjacent conveyor and then moves in a direction opposite to that of the conveyor that distance necessary for said thread guide to place a successive width of the given plurality of parallel weft threads onto the conveyor so that all the weft threads of each of said first and second thread guides extend in parallel between said opposed conveyors, said plurality of weft threads from said first second thread guides retained in position thereon until knitted together at the needle bed; and

roller guide means carried above said conveyors for laying stationary threads in the direction of travel of the longitudinal conveyors and being introduced over one layer of weft threads.

4,872,324

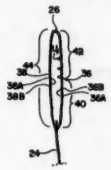
ELASTICIZED KNITTED BAND

Earle W. Rearwin, and Gayle L. Rearwin, both of Archdale, N.C., assignors to It's A Peach, Inc., High Point, N.C.

Continuation-in-part of Ser. No. 109,094, Oct. 15, 1987, abandoned. This application Dec. 6, 1988, Ser. No. 280,691

Int. Cl.[4] D04B *9/46*

U.S. Cl. 66—172 E **16 Claims**



1. An elasticized knitted band for use as a waistband or the like in pantyhose and other garments, said band having a knitted fabric body having a fabric face for facing contact with a wearer's body or undergarment and a fabric back for facing outwardly from the wearer, said fabric body comprising yarn formed in stitches extending in perpendicular courses and wales including an uncovered elastomer yarn knitted in selected courses in alternating knit and float stitches with the float stitches appearing at said fabric back of said fabric body for intermittent frictional contact with the wearer's body or undergarment through stitch interstices between said yarn of other courses, said float stitches of said uncovered elastomer yarn having a sufficient excess extent between said knit stitches of said uncovered elastomer yarn to be generally relaxed when said fabric body is stretched during wearing.

4,872,325

METHOD AND DEVICE FOR IMPRINTING WEBS

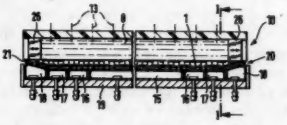
Manfred Moser, Krefeld-Fischeln; Dieter Itgenshorst, Krefeld, and Johannes Kutz, Tönisvorst, all of Fed. Rep. of Germany, assignors to Eduard Küsters Maschinenfabrik GmbH & Co KG, Krefeld, Fed. Rep. of Germany

Filed Jun. 19, 1987, Ser. No. 64,214

Claims priority, application Fed. Rep. of Germany, Jun. 21, 1986, 3620864

Int. Cl.[4] D06B *1/08*

U.S. Cl. 68—200 **6 Claims**



1. Apparatus for applying a treatment medium onto a continuously advancing web comprising:

(a) an applicator device containing a gap to which treatment medium is conducted for application of treatment medium onto the web as it passes through the gap, said gap having first and second mutually opposing faces extending transverse to the web through which the web passes, said first and second mutually opposing faces being provided on opposite sides of the web and being stationary in the direction parallel to the web;

(b) a pressurizable oblong cushion extending across the width of the web supported in a stationary abutment, said cushion being subdivided into a plurality of cushion sections defining said second mutually opposing face, which is resilient in the direction perpendicular to the web; and

(c) means for separately controlling the pressure in at least one of the cushion sections whereby the second mutually opposing face presses the web against the first mutually opposing face with non-uniform pressure that varies over the width of the web such that the amount of treatment medium applied to the web varies over the width of the web.

4,872,326

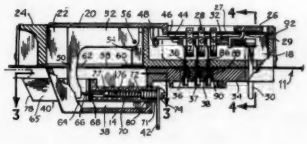
THREE STAGE COMBINATION REPLACEMENT LOCK

Harold O. Aurness, and Thomas G. Mahler, both of 5808 Knox Ave. N., Brooklyn Center, Minn. 55430

Filed Dec. 10, 1987, Ser. No. 130,894

Int. Cl.[4] E05B *65/06*

U.S. Cl. 70—133 **9 Claims**



1. In a lock unit comprising a three-stage system for use on a small hinged door utilizing an old access hole, the three thrages being: (1) dialing a combination lock which releases; (2) a sliding latch lock to be pushed which releases; (3) a push button which activates a door latch; an outer housing comprising in combination a patented combination lock comprising dials, inwardly extending reset buttons and reset arm, a latch lock button added to the sliding latch lock for easier use in opening the system after the lock is correctly dialed, a swivally attached push button tandem to the combination lock with a catch held in locked contact by the sliding latch of the combi-

nation lock, with an arm of the push button extending inwardly from the outer housing through a small rectangular door plate hole previously used for another type of lock, to a door latch chamber in an inside housing to contact the end of a spring controlled sliding push pin horizontally placed within a slot in the door latch; wherein the improvement is in the utilization of the small door plate hole, which is too small for a combination lock installation, for access to the door latch and push pin by the push button arm with the addition of two screw holes in the door plate to hold the housings to the door; with further improvement comprised of the said inside housing comprising of a housing plate opposite the combination lock with additional holes made in the door plate for the reset arm and the combination lock reset buttons which extend inwardly through the door plate and are used to neutralize the combination lock and change the combination respectively; a door latch chamber opposite the push button, containing the door latch which extends laterally through both ends of the chamber, with a slot through the outer half of the latch to accommodate the push button arm which contacts the sliding push pin and the inside face of the latch slot to push back the door latch which is contrained from sliding open from the normal lock position by spring means on either side of the door latch and blocked by the end wall of the latch chamber; with further improvement combining a handle means for opening the door latch from the inside with a screw means for adjusting the pressure of the spring activated sliding push pin in the inner half of the door latch, which automatically returns the push button to a desired flush position, latched and locked, in the outside housing; with further improvement provided by the addition of spring biased push buttons at each dial of the patented combination lock for easier resetting; a cover hinged on the outside of the unit for protection from the weather.

4,872,327

LOCKING DEVICE FOR A VALVE

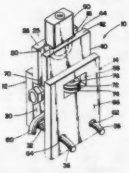
Thomas Wagner, Route 8 Box 289, Clarksville, Tenn. 37043

Filed Dec. 16, 1987, Ser. No. 133,636

The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.

Int. Cl.[4] G05G *5/00*

U.S. Cl. 70—175 **7 Claims**



1. A locking device for a valve to be used in conjunction with a lock having a hasp comprising:

a pair of detachably connected corresponding plates each having a shoulder that when in the connected condition substantially prevents the movement of the flow valve, one of said plates including an arm passing through a corresponding aperture in the other one of said plates so as to restrict the relative twisting of said members, each of said plates having an ear containing an aperture through which the hasp of a lock passes whereby the entire hasp is sandwiched between said plates, each one of said plates includes an upper member joined to a lower member in an overlapping fashion to form the shoulder, and each one of said uppers members includes a top edge having an interior corner containing a bevel, said bevel accommodating the body of the lock so that the entire hasp is sandwiched between said upper members.

4,872,328

DOOR LOCK FOR A MOTOR VEHICLE

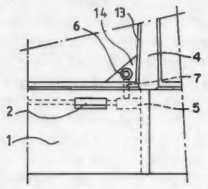
Lambertus J. Van Oijen, Budel, and Fokke Willems, Heeze, both of Netherlands, assignors to Volvo Car B.V., Netherlands

Filed Oct. 9, 1986, Ser. No. 916,911

Claims priority, application Netherlands, Oct. 10, 1985, 8502763

Int. Cl.[4] E05B *65/20*

U.S. Cl. 70—237 **1 Claim**



1. A door lock and door construction for a motor vehicle provided with a body having one or more doors, said door comprising a lower part and an upper part, said upper part further comprising a window pillar, such that said window pillar and said lower part partially define a window opening, said lower part further comprising a door lock being operable by inner and outer handles disposed in said lower part for opening and closing the door, said upper part further comprising a substantially right-triangularly shaped member formed of sheet metal wherein the right-angled sides of said sheet metal member are fixed to said window pillar and to said lower part such that the hypotenuse of said sheet metal member further defines said window opening, and wherein said sheet metal member has mounted therein a locking cylinder, said locking cylinder being operatively connected by a locking lever to said door lock for locking and unlocking said door lock.

4,872,329

KEY DEVICE AND A DETECTOR DEVICE FOR USE THEREWITH

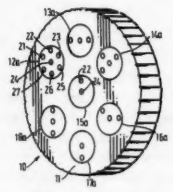
James J. Byrne, Edenderry, Ireland

Filed Aug. 6, 1987, Ser. No. 82,845

Claims priority, application Ireland, Aug. 8, 1986, 2129/86; Aug. 8, 1986, 2130/86; Oct. 10, 1986, 2681/86; May 22, 1987, 1352/87; May 22, 1987, 1353/87; Jul. 17, 1987, 1939/87

Int. Cl.[4] E05B *19/00*

U.S. Cl. 70—395 **24 Claims**



1. A key device which comprises a base notionally subdivided into a plurality of zones arranged in a predetermined pattern; each of said zones comprising an aperture for releasably receiving a respective element, the or each element having one or more sites associated therewith in a predetermined pattern; and wherein a measurable or detectable characteristic of the or each site may be selectively altered; the arrangement being such that the key device may be used in conjunction with

a detector device having means for analyzing the characteristic of the or each site.

4,872,330

PLANT FOR STRAIGHTENING AND CUTTING TO LENGTH ROLLED SECTIONS OR BARS

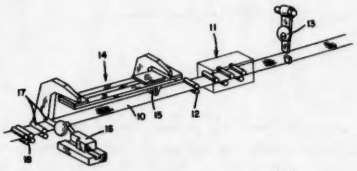
Geremia Nonini, Buttrio, Italy, assignor to Danieli & C. Officine Meccaniche SpA, Buttrio, Italy

Filed Feb. 17, 1988, Ser. No. 156,824

Claims priority, application Italy, Feb. 24, 1987, 83321 A/87

Int. Cl.[4] B21B *15/00*

U.S. Cl. 72—131 **3 Claims**



1. A plant for cutting to size rolled sections including angle irons, channel sections, T-bars, window profiles and trackways for lifts or elevators, and rolled bars including round bars and flat bars, comprising: a cooling plate; a feed line for receiving the rolled sections or bars from the cooling plate; a disk saw for cutting to size the rolled sections on the feed line; located upstream of the disk saw along said feed line for drawing and measuring the rolled sections in cooperation with the disk saw; means located downstream of the disk saw along the feed line, for butting and measuring different lengths of the rolled sections in cooperation with the disk saw; a straightening machine located downstream of the butting and measuring means, for straightening the rolled sections or bars on the feed line; and, a shears located downstream of the straightening machine, for cutting the rolled bars to size on the feed line while they are moving.

4,872,331

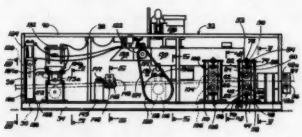
METHOD AND APPARATUS FOR ROOFING

Lawrence Skelton, 101 Harris La., Springdale, Ark. 72764

Division of Ser. No. 669,471, Nov. 8, 1984, Pat. No. 4,686,809. This application Oct. 14, 1986, Ser. No. 918,476

Int. Cl.[4] B21D *5/08*

U.S. Cl. 72—181 **1 Claim**



1. An apparatus for forming elongated roofing members having opposed male and female flanges joined by a flat central portion from an elongated strip of sheet material, said apparatus comprising:

a frame having an inlet side and a downstream outlet side;

a pair of parallel horizontally extending guide rollers rotatably mounted at said inlet side of said frame;

a first pair of parallel horizontally extending forming rollers rotatably mounted for independent vertical adjustment on said frame, downstream from said guide rollers;

said first pair of forming rollers having mutually engageable forming surfaces configured for forming a first flange extending angularly upwardly and then angularly downwardly along a first side edge of the sheet metal strip and a second flange extending angularly upwardly and then horizontally outwardly and then angularly downwardly along a second opposite side edge of the sheet metal strip;

a second pair of parallel horizontally extending forming rollers rotatably mounted for independent vertical adjustment on said frame, downstream from said first pair of forming rollers;

said second pair of forming rollers having mutually engageable forming surfaces configured for forming the first and second flanges of the sheet metal strip to a more acute angular configuration;

a horizontally extending driving roller mounted for rotation on said frame, downstream from said second pair of forming rollers;

means on said frame for rotating said driving roller;

a pair of coaxial idler rollers rotatably mounted on said frame extending parallel with said driving roller;

said idler rollers and said driving roller having mutually engageable forming surfaces configured for forming a third flange extending angularly upwardly and outwardly from the flat central portion of the sheet metal strip and terminating at the first flange, and a fourth flange extending angularly upwardly and outwardly from the flat central portion of the sheet metal strip and terminating at the second flange;

a first pair of pinch rollers rotatably mounted on said frame, downstream from said driving roller;

said first pair of pinch rollers having mutually engageable forming surfaces configured for forming the second and fourth flanges into a female flange having a first portion extending angularly upwardly from the flat central portion of the sheet metal strip, and offset second portion extending perpendicular to the first portion, a third portion extending angularly outward from the second portion in a direction away from the first portion, and a fourth portion extending angularly downwardly from the third portion in a direction away from the flat central portion;

a second pair of pinch rollers rotatably mounted on said frame, downstream from said driving roller;

said second pair of pinch rollers having mutually engageable forming surfaces configured for forming the first and third flanges into a male flange having a first portion extending angularly upwardly from the flat central portion of the sheet metal strip, a second portion extending angularly upwardly from the first portion towards the female flange, and a third portion doubled over the second portion;

a third pair of parallel horizontally extending forming rollers rotatably mounted on said frame, downstream from said first and second pairs of pinch rollers;

said third paid of forming rollers having mutually engageable forming surfaces configured for forming a pair of elongated rectangular ribs in the flat central portion of the sheet metal strip;

an enclosure mounted adjacent said outlet side of said frame;

a passageway for receiving the sheet metal strip formed through said enclosure, said passageway having a straight central portion and oppositely directed angularly upwardly extending side portions; and

a sheet metal cutter reciprocally mounted in said enclosure for severing the sheet metal strip.

4,872,332

METHOD AND DEVICE FOR SETTING BLIND RIVETS

Peter Potzas, AM Rinnerborn 58, D6305 Alten-Buseck Bundersrepublik Deutschland, Fed. Rep. of Germany

Continuation of Ser. No. 40,771, Mar. 24, 1987, abandoned. This application Jul. 18, 1988, Ser. No. 220,398

Claims priority, application Fed. Rep. of Germany, Sep. 4, 1985, 3531532

Int. Cl.[4] B21D *41/02*

U.S. Cl. 72—393 **22 Claims**

1. A device for setting blind rivets provided with cylindrical,

continuous hollow spaces and rivet heads, for connecting inner and outer structural parts which are accessible only on one side and are provided with bores in alignment with one another comprising:

a riveting mandrel having a thickened end, the diameter of which, at least in one dimension, is larger than the diameter of the cylindrical rivet hollow space,

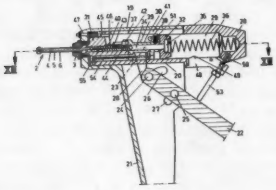
a holding-down part having a central bore in which the riveting mandrel is guided in an axially displaceable manner,

a pulling device for displacing the riveting mandrel in the direction out of the rivet hollow space,

said riveting mandrel comprising:

two flexible tongues which extend in the mandrel longitudinal direction, said tongues each including a free end on their sides pointing radially outwards and projections at the free ends thereof, said projections forming the thickened end,

a supporting element extending in the mandrel longitudinal direction provided between the tongues, said supporting element being displaceable in the longitudinal direction of the riveting mandrel relative to the tongues, said supporting element being movable between a forward position for opening out the rivet end and a pulled-back position for



pulling the mandrel out of the rivet hollow space after the rivet end is opened out, wherein when said supporting element is in the forward position, the supporting element is located in a position which is pushed forwards relative to the tongues and between the free ends of the tongues which are provided with the projections, and when said supporting element is in the pulled-back position, the tongue ends provided with the projections can be tilted towards one another.

wherein said drive mechanism comprises:

a drive piston quided in an axial direction of the riveting mandrel and mounted in a guide channel made in a tong housing,

a tongue piston bearing said tongues and arranged on a side of said drive piston pointing towards the working end of the riveting tool,

a slave piston provided on a side of said drive piston remote from the working end,

wherein said supporting element extends through central bores provided in all three pistons, projects through the slave piston and bears with a head against the side of the slave piston remote from the working end, and all three pistons are adapted to be coupled to one another selectively, dependent on the rivet setting operation.

4,872,333

WIRE DRAWING DIE

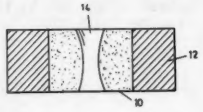
Richard P. Burnand, 39 Constantia Avenue, Alan Manor, Johannesburg, Transvaal, South Africa

Filed Apr. 8, 1986, Ser. No. 849,549

Claims priority, application South Africa, Apr. 9, 1985, 85/2607

Int. Cl.[4] B21C *3/02*

U.S. Cl. 72—467 **4 Claims**



1. A wire drawing die comprising a thermally stable diamond compact held in a supporting surround and having a hole through it capable of receiving wire to be drawn therethrough, the compact being resistant to significant graphitization resulting from integration with the supporting surround at ambient pressure conditions, the compact comprising a mass of diamond particles present in an amount of 80 to 90 percent by volume of the compact and the remainder as a second phase present in an amount of 10 to 20 percent by volume of the compact, the mass of diamond particles containing substantial diamond-to-diamond bonding to form a coherent, skeletal mass and a second phase consisting essentially of silicon, silicon carbide or a combination thereof.

4,872,334

VARIABLE FLOW CAPILLARY GAS CHROMATOGRAPHY METHOD

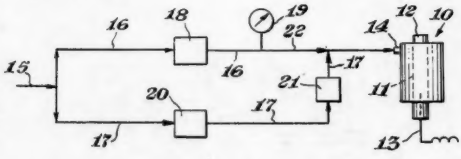
Chuichi Watanabe, Niihashi, Japan, assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 47,801, May 8, 1987, abandoned. This application Dec. 20, 1988, Ser. No. 287,692

Claims priority, application Japan, Sep. 5, 1986, 61-104761

Int. Cl.[4] G01N *31/08*

U.S. Cl. 73—23.1 **7 Claims**



1. A method for temperature programmed capillary column gas chromatography, comprising the steps of:

flowing a carrier gas through a gas chromatography injection port with essentially all of the carrier gas subsequently flowing into a gas chromatography capillary column at a first flow rate and a first pressure;

heating the column to a first temperature;

introducing a sample through the injection port, the sample comprising a solvent and a component of interest;

reducing the flow rate of the carrier gas to a second flow rate at a time longer than immediately after beginning the step of introducing the sample, the second flow rate being a normal flow rate for the column; and

increasing the temperature of the column so that the component of interest emerges from the column.

4,872,335

VIBRATING TYPE TRANSDUCER

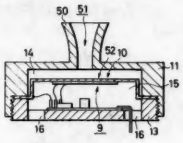
Michihiko Tsuruoka; Wataru Nakagawa; Noriomi Miyoshi; Naohiro Konosu, and Tadao Hashimoto, all of Kanagawa, Japan, assignors to Fuji Electric Co., Ltd., Kanagawa, Japan

Filed Oct. 24, 1986, Ser. No. 922,694

Claims priority, application Japan, Oct. 25, 1985, 60-239228; Nov. 11, 1985, 60-252424; Nov. 18, 1985, 60-258130; Feb. 24, 1986, 61-38906; Jun. 16, 1986, 61-139786

Int. Cl.[4] G01L *9/08;* **H04R** *17/00*

U.S. Cl. 73—30 **3 Claims**



1. A device to aid in detecting the resonant frequency of a diaphragm to measure properties of a fluid in contact therewith, said device comprising:

a container defining a cavity therein;

a diaphragm within said cavity, said diaphragm dividing said cavity into two chambers on opposite sides of said diaphragm, said diaphragm preventing flow communication between said chambers;

first fluid inlet means in flow communication with a first of said chambers for introducing said fluid to said first chamber, said first chamber having an acoustic compliance less than the mechanical compliance of said diaphragm, said first fluid inlet means including a conduit having a convergent bore; and

second fluid inlet means in flow communication with a second of said chambers for introducing fluid to said second chamber.

4,872,336

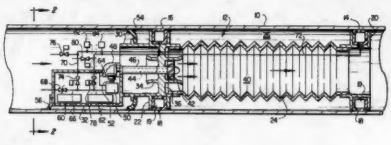
APPARATUS FOR PRESSURE TESTING PIPELINES

Lloyd A. Baillie, Plano, Tex., assignor to Atlantic Richfield Co., Los Angeles, Calif.

Filed Oct. 5, 1988, Ser. No. 253,781

Int. Cl.[4] G01M *3/04*

U.S. Cl. 73—40.5 R **12 Claims**



1. Apparatus for pressure testing a section of pipe of a fluid transmission pipeline without shutoff of fluid flow through said pipeline during said pressure test, said apparatus comprising:

spaced apart seal means for engaging a wall of said pipe to form a substantially fluid pressure tight seal therewith;

generally flexible tubular means interconnecting said seal means and defining with said seal means a generally annular space between said seal means for pressure fluid testing said section of pipe between said seal means;

pump means for pumping pressure fluid to flow into said seal means and said annular space for pressurizing said seal means to form a fluid tight seal to prevent leakage of fluid from said annular space and to increase the pressure of fluid in said annular space for said pressure testing said section of pipe; and

conduit means connected to said pump means for receiving pressure fluid from within said section of pipe for pressurizing said seal means and said annular space.

4,872,337

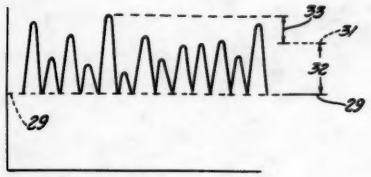
NONDESTRUCTIVE TESTING OF GEARS

Robert J. Watts, 22430 St. Clair Dr., St. Clair Shores, Macomb, Mich. 48081; David A. Rice, 25 Village View Bluff, Ballston Lake, Saratoga, N.Y. 12019, and John A. Neun, 80 St. Andrews Dr., Clifton Park, Saratoga, N.Y. 12065

Filed Jan. 29, 1988, Ser. No. 150,114

Int. Cl.[4] G01M *13/02;* **G06F** *07/02*

U.S. Cl. 73—162 **4 Claims**



1. A method of determining the acceptability of a first gear in a set of rotatable gears within a case of a given automotive transmission, the first gear being meshed with a second gear in the set, the method comprising:

(a) producing a synchronizer signal once per a period corresponding to one or more complete revolutions of the first gear;

(b) using a vibration sensor to output an analog electrical signal corresponding to vibrations of the gear case, the sensor generating an analog signal for a plurality of said periods;

(c) averaging together the analog signals from the periods to form a composite signal whose duration is a single period and whose form is that of a wave having peaks and valleys;

(d) selecting points within the single period and then determining absolute values of the amplitude of the composite signal at the selected points, and then calculating the root mean square of the selected absolute values;

(e) repeating steps a) through d) for each gear in the set of rotatable gears, and then averaging the root mean squares found for each repetition of these steps, thereby deriving a normalization factor for the given transmission;

(f) band pass filtering the composite signal to obtain a plurality of component signals corresponding to the first, second and one or more subsequent harmonics of the composite signal, the components signals having a wave form with evenly spaced peaks and valleys disposed along a reference line;

(g) for each component signal, determining the individual absolute values of the amplitude of peaks or valleys and then ascertaining the average value for the absolute values so determined;

(h) for each component signal, determining the the statistical standard deviation for the amount by which the absolute values deviate from the average value;

(i) for each component signal, deriving a first and second weighting factor, each weighting factor based upon the harmonic of the component signal, the gear ratio between the first and second gears, the rotational speed of a gear shaft upon which the first gear is mounted, the gear type of the first gear, and the position of the first gear relative to others gears in the gear train;

(j) using the average values for the absolute values derived in step g, the statistical standard deviations from step h, the

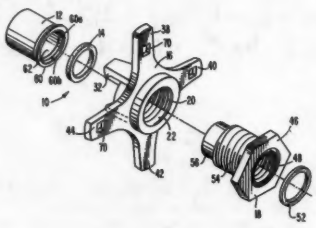
normalization factor from step e, and the weighting factors from step i to calculate a first fault characterization parameter;

(k) comparing the first fault characterization parameter to a selected fault characterization parameter for gears similar to the first gear in transmission similar to the given transmission.

4,872,338
EXPANSION MECHANISM FOR METER BOX OR METER YOKE

José M. Rivero-Olmedo, Santurce, P.R.

Continuation of Ser. No. 170,644, Mar. 16, 1988, abandoned, which is a continuation of Ser. No. 816,903, Jan. 8, 1986, abandoned. This application Sep. 29, 1988, Ser. No. 251,987
Int. Cl.[4] G01F *15/18*
U.S. Cl. 73—201 **16 Claims**



1. An expansion mechanism for connecting a meter within a meter box or yoke, comprising:

a hand wheel having a partially threaded axial opening therethrough with an annular rim extending inwardly into said axial opening, and positioning prongs at one end of said axial opening, said annular rim having an annular surface with a diameter less than a diameter of said axial opening through said hand wheel;

a bushing having an outer threaded portion cooperating with said partially threaded axial opening in said hand wheel, a sleeve cooperating with and providing a close fit with said annular surface of said annular rim, and means for operatively connecting said bushing to a conduit;

a cup comprising a sleeve having a flaring rim at one end and an opening at an opposite end thereof, said cup being retained by said prongs of said hand wheel; and

an annular gasket positioned about said sleeve of said bushing, and located between said flaring rim and said annular rim, whereby threaded movement between said hand wheel and said bushing may place sealing pressure on said annular gasket.

4,872,339
MASS FLOW METER

Bruce Gerhard, Canton, and Bruce Schulman, Newton, both of Mass., assignors to NEC Electronics Inc., Mountain View, Calif.

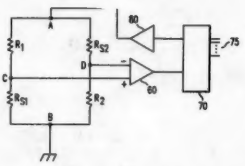
Filed Aug. 3, 1988, Ser. No. 227,934
Int. Cl.[4] G01F *1/68*
U.S. Cl. 73—204.14 **8 Claims**

1. A mass air flow meter comprising:

a bridge circuit having first and second input terminals and having first and second output terminals, said bridge circuit having incorporated in one or more arms a resistive sensing means, said sensing means having a resistance which varies proportionally to a change in its temperature, wherein said sensing means has heat removed from it by an air flow;

a comparator means with first and second input terminals coupled to said first and second output terminals of said bridge circuit, respectively, wherein said comparator means produces an output in response to a voltage difference between voltages at said first and second output terminals of said bridge circuit;

a microcomputer with an input terminal coupled to receive said output of said comparator, said microcomputer producing a pulsewidth modulated signal at a first output of said microcomputer whose duty cycle is controlled solely by said output of said comparator in conjunction with an update algorithm, wherein said algorithm uses a control loop which makes repeated evaluations of said output of said comparator and makes repeated changes in said duty cycle of said pulsewidth modulated signal until said output of said comparator has changed in response to a change in said duty cycle, said microcomputer generating digital



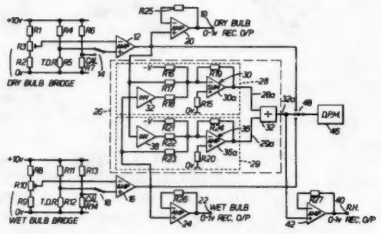
signals corresponding to said duty cycle of said pulsewidth modulated signal, said digital signals corresponding to said duty cycle being used for computing mass air flow and to control parameters in an engine's operation, said pulsewidth modulated signal having a period which is small relative to any time required to measurably change said resistance of said sensing means; and

an amplifier with an input terminal coupled to said pulsewidth modulated signal, and first and second output terminals coupled to said first and second input terminals of said bridge circuit, respectively, wherein said amplifier provides pulsewidth modulated voltage across said first and second input terminals of said bridge circuit sufficient to maintain said resistance of said sensing means at a substantially constant resistance.

4,872,340
PSYCHROMETER

John L. de Yong, Victoria, Australia, assignor to Commonwealth Scientific and Industrial Research Organization, Campbell, Australia

Filed Aug. 20, 1981, Ser. No. 294,642
Claims priority, application Australia, Aug. 22, 1980, PE5203
Int. Cl.[4] G01N *25/64, 1/06*
U.S. Cl. 73—338 **4 Claims**



1. A psychrometer comprising first means for providing a first electrical signal representative of dry bulb temperature, second means for providing a second electrical signal representative of wet bulb temperature, and signal processing means coupled to said first and second means to in use provide an

output signal representative of the relative humidity in accordance with the equation:

$$RH = \frac{\alpha + \beta t + \gamma t'}{\alpha' + \beta' t + \gamma' t'}$$

wherein said signal processing means comprises numerator means in use generating the numerator of said equation, denominator means in use generating the denominator of said equation, and divider means in use generating the said output signal by division of output from said numerator means by the output of said denominator means, and

wherein said numerator means includes a first inverter connected to in use receive said second signal and a first summing amplifier of the kind in which signals are presented for summing to a first common junction via respective resistors selected to weight the so presented signals, said first junction being connected via first, second and third resistors respectively to a source of fixed negative voltage, the output of said first means, and to the output of said first inverter, whereby the constants α, β and γ are determined in accordance with the values of said first, second and third resistors respectively.

4,872,341

SEALING JOINT

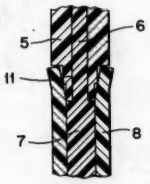
Erika Wahlen, Erlinsbach, Switzerland, assignor to Kern & Co., Aarau, Switzerland

Filed Aug. 17, 1988, Ser. No. 232,997

Claims priority, application Switzerland, Sep. 2, 1987, 3360/87

Int. Cl.[4] G12B *9/04;* **G01C** *15/00;* **G01D** *11/24;* **F16J** *15/04*

U.S. Cl. 73—431 **7 Claims**



7. A surveying instrument having a plastic casing for protecting parts of the instrument against damage from moisture, said comprising three components detachably connected together at their adjacent edge portions with a press fit along joints three of which meet at a common point, said detachable connection being established through interlocking sealing elements of which have projecting lands and some of which have recesses for receiving lands from other sealing elements, a first of said components of said casing being provided with a sealing having in the vicinity of said common point a land which is received within a recess in a sealing element of a third of said casing components and which land has therein a recess for receiving a land from a sealing element of a second of said casing components.

4,872,342

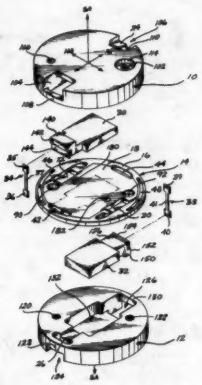
TRANSLATIONAL ACCELEROMETER AND ACCELEROMETER ASSEMBLY METHOD

Richard A. Hanson; Rex B. Peters, both of Woodinville; Brian L. Norling, Mill Creek, and Edward A. Urbach, Duvall, all of Wash., assignors to Sundstrand Data Control, Inc., Redmond, Wash.

Continuation of Ser. No. 65,432, Jun. 23, 1987, abandoned, which is a continuation-in-part of Ser. No. 879,473, Jun. 27, 1986, abandoned. This application Jul. 21, 1988, Ser. No. 222,680

Int. Cl.[4] G01P *15/08*

U.S. Cl. 73—517 R **40 Claims**



1. An accelerometer for measuring acceleration along a sensitive axis, comprising:

a body:

a proof mass;

mounting means for mounting the proof mass to the body, the mounting means comprising first and second flexures connected to the proof mass and arranged to permit substantially uncoupled translational and rotational motion of the proof mass with respect to the body such that the translational motion is along the sensitive axis and such that the rotational motion is about a single hinge axis perpendicular to the sensitive axis, the first and second flexures being positioned on opposite sides of a pendulous axis that is normal to the hinge axis and to the sensitive axis and that passes through the center of mass of the proof mass, each flexure having a hinge axis aligned along said single hinge axis, whereby acceleration ofthe accelerometer along the sensitive axis results in said translational motion of the proof mass along the sensitive axis; and

sensing means for reacting to said translational motion by producing a signal indicative of acceleration along the sensitive axis.

4,872,343

MATCHED PAIRS OF FORCE TRANSDUCERS

Rex B. Peters, Woodinville, and Craig J. Cornelius, Redmond, both of Wash., assignors to Sundstrand Data Control, Inc., Redmond, Wash.

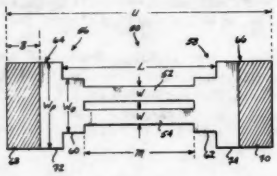
Filed Aug. 10, 1988, Ser. No. 230,791

Int. Cl.[4] G01P *15/08, 15/10*

U.S. Cl. 73—517 AV **16 Claims**

1. In an accelerometer of the type comprising first and second vibrating beam force transducers that produce respective first and second output signals having respective first and second frequencies, and that are connected in a push-pull arrangement in which for a given acceleration along a sensing axis, one frequency increases and the other frequency de-

creases, the first transducer comprising a pair of first beams and the second transducer comprising a pair of second beams, the improvement wherein the beam dimensions are selected



such that the Euler buckling constants of the first and second transducers are substantially equal to one another, and such that in the absence of acceleration along the sensing axis, the first and second frequencies are different from one another.

4,872,344

METHOD OF NONDESTRUCTIVE QUALITY CONTROL OF CARBON ARTICLES

Anatoly F. Grebenkin; Boris A. Glagovsky; Igor B. Moskovenko, and Ljudmila P. Lasukova, all of Leningrad, U.S.S.R., assignors to Vsesojuzny Nauchno-Issledovatelsky I Proektny Institut Aljuminievoi, Magnievoi I Elektrodnoi, Leningrad, U.S.S.R.

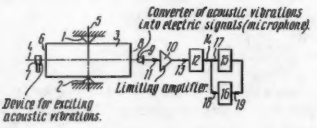
PCT No. PCT/SU86/00117, § 371 Date Nov. 4, 1987, § 102(e) Date Nov. 4, 1987, PCT Pub. No. WO87/05392, PCT Pub. Date Sep. 11, 1987

PCT Filed Nov. 20, 1986, Ser. No. 153,270

Claims priority, application U.S.S.R., Mar. 6, 1986, 4052258

Int. Cl.[4] G01N *29/00*

U.S. Cl. 73—579 **1 Claim**


Converter of acoustic vibrations into electric signals (microphone).
Limiting amplifier
Device for exciting acoustic vibrations.

1. A method of nondestructive quality control of carbon articles, comprising the steps of exciting acoustic vibrations in each carbon article taken from a group of carbon articles and in a specimen cut out from at least one carbon article, converting the acoustic vibrations in each carbon article and in the specimen into an electric signal having a frequency corresponding to the frequency of the acoustic vibrations, measuring the frequency of the electric signal to determine the frequency of the acoustic vibrations in each carbon article and in the specimen, determining the rate of propagation of the acoustic vibrations in the specimen and in the corresponding carbon article, determining the rate of propagation of the acoustic vibrations in each carbon article, measuring the specific electric resistance of selected carbon articles, establishing the relationship of the rate of propagation of the acoustic vibrations in a carbon article to its specific electric resistance, determining the range of the rate of propagation of the acoustic vibrations from the range of predetermined values of the specific electric resistance, and selecting carbon articles falling within the range of the rate of propagation of acoustic vibrations, held representative of the quality of a carbon article, wherein after the determination of the rate of propagation of the acoustic vibrations in each carbon article (3), there are selected from the group of carbon articles at least one carbon article (3) with the lowest determined rate of propagation of the acoustic vibrations therein and at least one carbon article (3) with the highest determined rate of propagation of the acoustic vibrations therein, followed by cutting out from each thus selected carbon article (3) "n" specimens longitudinally thereof and "m" specimens across the longitudinal axis thereof, exciting acoustic vibrations in each of said "n" and "m" specimens, converting acoustic vibrations in each one of said "n" and "m" specimens into an electric signal having a frequency corresponding to the frequency of the acoustic vibrations, measuring the frequency of the electric signal to determine the frequency of the acoustic vibrations in each one of said "n" and "m" specimens, determining successively the rate of propagation of acoustic vibrations in and the specific electric resistance of each one of said "n" and "m" specimens, determining the rate of propagation of acoustic vibrations in said selected carbon articles (3) by finding its averaged value therein from an expression:

$$C_e = \frac{1}{n+m} \sum_{1}^{n+m} C_e,$$

where C_e is the rate of propagation of acoustic vibrations, the specific electric resistance of carbon articles in the group, of which the quantity is defined by the number of said selected carbon articles (3), is determined by finding its averaged value from an expression:

$$\rho = \frac{1}{n+m} \sum_{1}^{n+m} \rho,$$

where ρ is the specific electric resistance, and the establishment of the relationship of the rate of propagation of the acoustic vibrations in a carbon article (3) to its specific electric resistance is effected by finding the linear correlated relationship of the averaged value of the rate of propagation of the acoustic vibrations in said selected carbon articles (3) to the averaged value of their specific electric resistance.

4,872,345

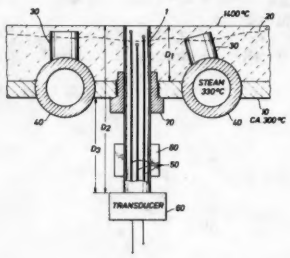
MEASURING WALL EROSION

Lynton W. R. Dicks, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Mar. 30, 1988, Ser. No. 175,028

Int. Cl.[4] G01B *17/02*; G01N *17/00*

U.S. Cl. 73—597 **8 Claims**



1. A method for measuring decreasing thickness of the refractory lining of a high pressure, high temperature, water cooled reactor wall during operation of the reactor comprising:

(a) inserting a pulse-echo ultrasonic probe, which will erode at substantially the same rate as the refractory lining, into an opening in the wall of the reactor to the internal face of the refractory lining;

(b) measuring the pulse-echo signal of the probe over time so that there is an initial measure of the pulse-echo signal for the initial thickness of the lining and a current measure of the pulse-echo signal for the current thickness of the lining;

(c) calculating the thickness of the lining of the wall from the thickness measured at the initial time and the thickness measured at the current time;

(d) measuring at least one of (1) a temperature gradient which occurs in the probe over the time of operation; and (2) a sound velocity change as a function of the temperature;

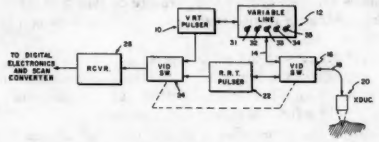
(e) adjusting the calculated thickness of the lining of the wall using at least one of (1) the temperature gradient to compensate for the thermal expansion and (2) the sound velocity change of step (d); and
(f) providing an adjusted calculated thickness of the lining of the wall.

4,872,346

MULTIPLE FREQUENCIES FROM SINGLE CRYSTAL

Elizabeth Kelly-Fry, and Steven T. Morris, both of Indianapolis, Ind., assignors to Indianapolis Center for Advanced Research, Indianapolis, Ind.

Continuation of Ser. No. 888,023, Jul. 18, 1986, abandoned. This application Jun. 30, 1988, Ser. No. 214,847
Int. Cl.[4] G01N *29/00*
U.S. Cl. 73—627 **15 Claims**



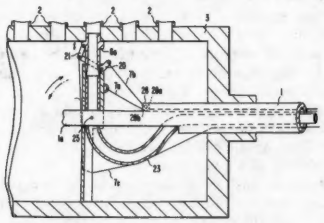
1. A method of ultrasound imaging of a material, the method comprising the steps of selectively generating an electrical pulse having a first rate of rise in absolute magnitude or an electrical pulse having a second, relatively longer rate of rise in absolute magnitude, coupling the electrical pulse through a modifying network to an acoustical transducer for conversion into an acoustical pulse, receiving echoes of the acoustical pulse, and coupling echo-related signals to signal processing circuitry.

4,872,347

AUTOMATED ULTRASONIC EXAMINATION SYSTEM FOR HEAT TRANSFER TUBES IN A BOILER

Yoshimi Okabe, Tokyo; Keiichi Iwamoto, Nagasaki; Masaaki Torichigai, Nagasaki; Shozo Kaneko, Nagasaki; Joji Ichinari, Nagasaki, and Kiyoshi Koizumi, Tokyo, all of Japan, assignors to Tokyo Electric Power Co. and Mitsubishi Jukogyo Kabushiki Kaisha, both of Tokyo, Japan

Filed Feb. 1, 1988, Ser. No. 151,093
Claims priority, application Japan, Jan. 30, 1987, 62-19904
Int. Cl.[4] G01N *29/00*
U.S. Cl. 73—634 **6 Claims**



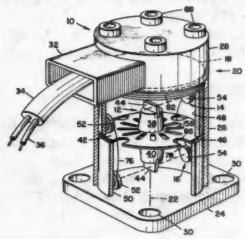
1. An automated ultrasonic examination system for examining heat transfer tubes open to a cylindrical body in a boiler, said system comprising:
an insert tube having a longitudinal axis;
an insert tube moving device for moving said insert tube axially and for rotating said insert tube about the longitudinal axis thereof;
a pressurized water ejection nozzle rotatably mounted to said insert tube about a pivot axis extending orthogonally to the axis of said insert tube;
a drive mechanism extending through said insert tube and operatively connected to said pressurized water ejection nozzle for rotating said nozzle about said pivot axis;
a pressurized water feed pump operatively connectable in the system to said pressurized water ejection nozzle for feeding pressurized water to said nozzle;
a cable insertable through said insert tube and said pressurized water ejection nozzle and payable from said nozzle under pressurized water fed to said nozzle;
a cable accommodation tank for accommodating said cable;
a revolvable and submergible ultrasonic probe mounted to an end of said cable for performing ultrasonic testing and for issuing signals indicative of the ultrasonic testing; and
an ultrasonic examination unit operatively connectable in the system to said probe for processing the signals issued by said probe.

4,872,348

SIGNAL ADDED VIBRATION TRANSDUCER

Stephen J. Curry, Bridgeport, Conn., assignor to Avco Corporation, Providence, R.I.

Filed Jan. 28, 1988, Ser. No. 149,376
Int. Cl.[4] G01P *15/03*
U.S. Cl. 73—653 **10 Claims**



1. A vibration measurement transducer comprising:
an elongated vibratory element having predetermined mass;
a case enclosing said element;
suspension means for mechanically coupling the element to said case, the suspension means permitting displacement of said element relative to said case in response to a vibration applied to said case;
restraining means operatively connected to said suspension means for restraining displacement of said element to one direction of motion parallel to an axis of said case, said restraining means maintaining a longitudinal axis of said vibratory element parallel to said case axis; and
displacement sensor means disposed within said case for sensing displacement of said element relative to said case, the sensor means comprising two sensors located relative to said element for sensing displacement of opposite ends of said element, the sensor means further comprising means for algebraically combining signals of the two sensors for improved signal-to-noise ratio; and wherein
said two sensors are disposed on said case axis at opposite ends of a path of displacement of said vibratory element each of said sensors including means for illuminating an end portion of said vibratory element with light rays directed in a direction normal to said one direction of motion of said vibratory element, an intrusion of said vibratory element into the light rays of a sensor providing an indication of displacement of said vibratory element.

4,872,349

MICROCOMPUTERIZED FORCE TRANSDUCER

Eugenio Espiritu-Santo, Fairfield, Ohio, assignor to General Electric Company, Cincinnati, Ohio

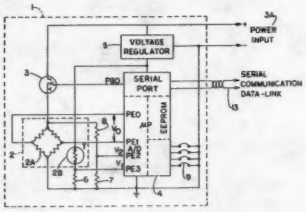
Filed Oct. 31, 1986, Ser. No. 925,339
Int. Cl.[4] G01L *7/08, 9/06*
U.S. Cl. 73—727 **14 Claims**

1. A transducer apparatus, comprising:

a means for producing an electrical output signal related to force;

a means for supplying electrical power to the producing means;

a switching means for modulating the power supplied to the producing means by the supplying means by repetitively



connecting and disconnecting the supplying means to and from the producing means; and

a means synchronized with the modulating means for sampling the electrical output signal related to force at a predetermined time during the time the modulating means connects the supplying means to the producing means.

4,872,350

MECHANICAL QUANTITY SENSOR ELEMENT

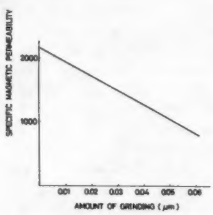
Naomasa Kimura, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 26, 1988, Ser. No. 160,742

Claims priority, application Japan, Feb. 27, 1987, 62-43164

Int. Cl.[4] H01F *1/00*

U.S. Cl. 73—779 **5 Claims**



1. A mechanical quantity sensor element making use of a stress-magneto effect of noncrystalline magnetic alloy having positive magnetastriction, wherein treatment is effected such that an external force is applied onto a surface of a thin belt made of noncrystalline magnetic alloy, and thereby compression strain is preliminarily given to and retained by at least a part of the thin belt.

4,872,351

NET OIL COMPUTER

James R. Ruesch, Boulder, Colo., assignor to Micro Motion Incorporated, Boulder, Colo.

Continuation of Ser. No. 235,234, Aug. 23, 1988, abandoned, which is a continuation of Ser. No. 916,780, Oct. 9, 1986, abandoned. This application Apr. 14, 1989, Ser. No. 339,128

Int. Cl.[4] G01F *1/74*

U.S. Cl. 73—861.04 **36 Claims**

1. Apparatus for a flow metering system using a Coriolis meter having at least one flow tube which is driven to resonantly oscillate in a substantially sinusoidal manner about a bending axis while an emulsion formed of at least two substantially immiscible components flows through said flow tube, said apparatus comprising:

a flow rate measuring circuit comprising:

means for sensing a time interval occurring between a first point in time at which one side leg of said flow tube reaches a pre-defined point in its travel and a second point in time at which a second side leg of said flow tube and counterpart to said first side leg reaches a corresponding pre-defined point in its travel, whereby the duration of this interval is proportional to both Coriolis forces induced by movement of a given fluid flowing through said flow tube and to flow rate of said given fluid flowing through said flow tube; and

means, responsive to said sensed time interval, for producing a stream of flow rate pulses having a frequency proportional to the flow rate of said given fluid; and

a first circuit comprising:

means for measuring a value of a period at which said flow tube resonantly vibrates while the given fluid flows therethrough and for generating a first interrupt at the conclusion of each period value measurement;

means for measuring a temperature of said flow tube;

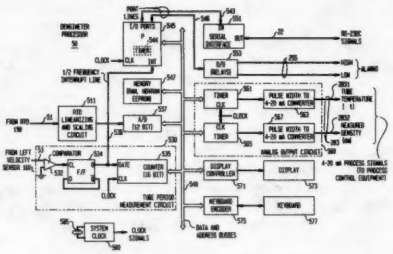
first means for displaying a value of density of said given fluid; and

a first processing circuit comprising:

means, responsive to an occurrence of said first interrupt, for filtering said period value measurement to yield a filtered period measurement;

means for generating a second interrupt at a first predefined periodic interval of time;

means, operative in response to an occurrence of said second interrupt and to said temperature measuring means, for providing a measured temperature value of said flow tube coincidentally occurring while said given fluid flows therethrough;



means for determining, in response to the measured temperature value, a temperature coefficient value for said given fluid;

means, responsive to said temperature coefficient determining means and to said filtered period measurement, for determining a first factor as being a product of said temperature coefficient value and a square of said period value;

means, responsive to said first factor and to second and third factors associated with first and second known calibration fluids, for producing a current density value of said given fluid;

means, responsive to said current density value, for updating the displayed density value appearing on said first displaying means with said current density value at a second pre-defined periodic interval of time, wherein said second pre-defined interval is longer than said first pre-defined interval;

means for compensating corresponding first and second reference density values for first and second immiscible components present in said emulsion to the measured temperature value in order to yield corresponding first and second temperature compensated density values;

means, responsive to said current density value, and to said first and second temperature compensated density values, for generating corresponding first and second density ratios of the first and second immiscible components that are present within said given emulsion; and

means for applying said first and second density ratios to a second circuit; and

a second circuit, operative in response to said first and second density ratios and said flow rate pulses, comprising:

means for totalizing the flow rate pulses to produce a totalized flow value;

means for receiving said first and second density ratios from said first circuit to generate corresponding first and second received density ratios and, in response thereto, for generating a third interrupt;

second means for displaying either a corresponding flow rate of said emulsion, said first or said second immiscible components or corresponding totalized values of the flow of said emulsion or said first or said second immiscible components;

a second processing circuit comprising:

means, operative in response to said receiving and generating means, for storing the first and second received density ratios, at an occurrence of said third interrupt, in appropriate memory locations in order to provide corresponding stored first and second density ratios;

means for generating a fourth interrupt at a third predefined periodic interval of time;

means, responsive to the occurrence of said fourth interrupt, for converting the totalized flow value that occurs over a fourth periodic interval of time into a current flow rate value; wherein said fourth interval is longer than said third interval;

means, responsive to the stored first and second density ratios and to said totalized flow rate value occurring over said fourth interval, for generating corresponding current values of totalized flow for said emulsion and of said first and second components;

means, responsive to the corresponding current values of flow rate and totalized flow for said emulsion and said first and second components, for selectively updating a corresponding displayed value appearing on said second display means;

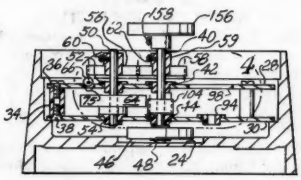
wherein said apparatus further comprises means for corresponding setting each of the second and third factors substantially equal to the first factor that occurs when the first and second known calibration fluids are correspondingly and selectively passed through the flow tube in order to calibrate the meter.

4,872,352

FLOW METER PULSE TRANSMITTER

Kevin Alden, 23983 Enriquez Dr., Diamond Bar, Calif. 91765, and Charles Alden, Escondito, Calif., assignors to Kevin Alden, Diamond Bar, Calif.

Filed May 12, 1986, Ser. No. 862,311
Int. Cl.[4] G01F *1/075, 1/115*
U.S. Cl. 73—861.77 **19 Claims**



1. Apparatus for generating pulses corresponding to the rotation of a rotating member, the apparatus comprising:

(a) a rotatably mounted input shaft;

(b) means on the input shaft for coupling the input shaft to the rotating member;

(c) an output shaft;

(d) means for repetitively interrupting an electrical current in response to rotation of the output shaft;

(e) sleeve means on and concentric with the input shaft;

(f) calibration gear means for rotating the output shaft in response to rotation of the sleeve means; and

(g) range means for rotating the sleeve means at a predetermined turns ratio relative to the input shaft, comprising:

(i) auxiliary support means for rotatably mounting a compound shaft and gearing the compound shaft to the input shaft and to the sleeve means;

(ii) a first range member operatively connected between the input shaft and the sleeve means, whereby the turns ratio is a first turns ratio; and

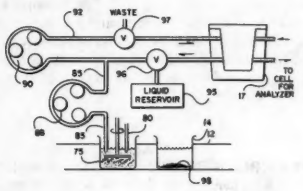
(iii) means for disconnecting the first range member and receiving and connecting a second range member between the input shaft and the sleeve means at a second turns ratio without disturbing the mounting of the input shaft during the disconnecting of the first range member and the receiving and connecting of the second range member.

4,872,353

AUTOMATIC SAMPLE FEEDER FOR SUSPENDED SAMPLES

Clyde Orr, Jr., Dunwoody, and Ronnie Camp, Duluth, both of Ga., assignors to Micromeritics Instrument Corp., Norcross, Ga.

Continuation-in-part of Ser. No. 125,395, Nov. 25, 1987. This application Feb. 19, 1988, Ser. No. 157,705
Int. Cl.[4] G01N *35/00*
U.S. Cl. 73—864.85 **16 Claims**



1. An apparatus for feeding particulate samples to an analyzer, comprising:

a plurality of sample containers for storing particulate samples and liquid in which said particulate is to be suspended; and

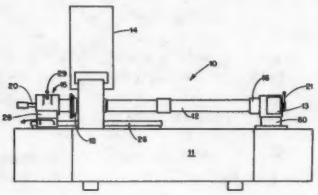
sample preparation and delivery means responsive to a first signal from said analyzer for suspending a first sample in a first one of said containers in said liquid and for removing a volume of said first sample from said first container and delivering said volume of said first sample to said analyzer while said first sample is being maintained in suspension in said first sample container, and responsive to a second signal from said analyzer for suspending a second sample in a second one of said containers in said liquid and for removing a volume of said second sample from said second container and delivering said volume of said second sample to said analyzer while said second sample is being maintained in suspension in said second sample container.

4,872,354

HOLLOW SHAFT MEASUREMENT DEVICE

Marian Barasch, Albany, and Charles H. Mirella, Clifton Park, both of N.Y., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jul. 30, 1987, Ser. No. 79,366
Int. Cl.[4] G01R *27/26*
U.S. Cl. 73—865.8 2 Claims



1. A hollow shaft measurement machine, said machine comprising:

a measurement table, said measurement table having a flat upper measurement surface;

means for measuring external dimensions of a hollow shaft, said means for measuring movably mounted upon said measurement table;

a rotatable chuck, said rotatable chuck mounted to said measurement table, said rotatable chuck having means for holding and centering a first end of said hollow shaft;

a rotatable centering device, said rotatable centering device having means for holding a second end of said hollow shaft, said rotatable centering device having a cylindrical bearing hole therethrough, said rotatable centering device movably mounted to said measurement table;

a gauge head, said gauge head rotatably mounted in said bearing hole of said centering device, said gauge head having internal measurement means for insertion into the second end of said hollow shaft for measuring internal dimensions of said hollow shaft; and

signal processing means, said signal processing means connected to said means for measuring external dimensions and to said gauge head for measuring internal dimensions of said hollow shaft, said signal processing means including a computer for controlling actuators that move said means for measuring.

4,872,355

MICROCUBE INTERCONNECTION HARDWARE

Roderick G. Rohrberg, 2742 W. 234th St., Torrance, Calif. 90505; Timothy K. Rohrberg, 2800 Plz. Del Amo #406, Torrance, Calif. 90505, and Kevin D. McGushion, 2450 Oak St. #E, Santa Monica, Calif. 90405

Filed May 20, 1988, Ser. No. 196,993
Int. Cl.[4] G01D *11/30;* G01F *15/18;* G01L *19/00;* G01K *1/14*
U.S. Cl. 73—866.5 13 Claims

6. A MicroControl Module comprising in combination:

a gas filter and an inlet fitting connected to an inlet;

a first valve connected to said inlet fitting and to a first MicroCube Precision Fitting;

said first MicroCube being further connected to a pressure regulator and a second valve;

said second MicroCube Precision Fitting being connected to an inert gas fitting;

said inert gas fitting being connected to an inert gas supply line,

said second MicroCube being further connected to a third valve;

said third valve being connected to a MicroVac Vacuum Generator including a first MicroSensor having a Microcube and a gas sensor;

said MicroVac Vacuum Generator being further connected to a vent line and a fourth valve;

said fourth valve being connected to a second MicroSensor;

said second MicroSensor being connected to said pressure regulator, to said fourth valve, to a fifth valve, and to an excess pressure valve;

said fifth valve being further connected to a process gas fitting;

each of said MicroCube Precision Fittings having a unitary substantially cubical body and having a central chamber;

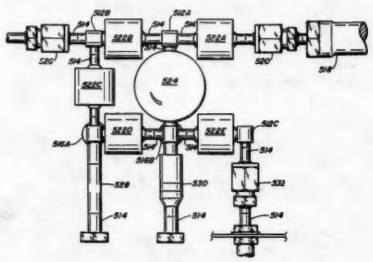
said body having at least one external port in communication with said central chamber;

said port further including an annular counterbored step; and

said MicroVac Vacuum Generator including:

a MicroCube Precision Fitting having a unitary substantially cubical body and having a central chamber;

said body having at least one external port in communication with said central chamber;



said port further including an annular counterbored step;

an inlet coupled to said MicroCube Precision Fitting having an aperture for receiving a high pressure flow of gas;

a first stage disposed within said inlet and in communication with said inlet for successively compressing and expanding said flow of gas;

a contaminant port coupled to said MicroCube Precision Fitting for connection to a contaminated volume;

said contaminant port being disposed generally perpendicular to said first stage;

an outlet coupled to said MicroCube Precision Fitting having an aperture for exhausting said high pressure flow of gas;

a second stage disposed within said MicroCube Precision Fitting for successively compressing and expanding said flow of gas; and

said second stage being oriented substantially coaxially with said first stage.

4,872,356

RESISTIVITY PROBE FIXTURE

Jay D. Barnett, Mountain Home; Bryan J. Ludwig, Meridian; Ernest E. Marks, and Scott E. Moore, both of Boise, all of Id., assignors to Micron Technology Inc., Boise, Id.

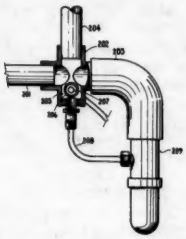
Filed Dec. 27, 1988, Ser. No. 290,458
Int. Cl.[4] B08B *3/00*
U.S. Cl. 73—866.5 9 Claims

1. Resistivity probe mounting apparatus for use with a wafer washing machine having fluid discharge means, said apparatus comprising:

(a) a fitting, having a probe submersion chamber, having an inlet in fluid communication with the fluid discharge means, and having a primary outlet, the chamber lower than said inlet and outlet so that it will retain discharge fluid;

(b) means for positioning a probe within said chamber so that the chamber when full will submerge said probe; and

(c) said chamber having a secondary outlet at its bottom, said secondary outlet being restricted so that during a



typical discharge the chamber will be filled, yet will drain empty after discharge.

4,872,357

DEVICE FOR TEMPORARILY LOCKING A ROTOR ONTO A STATOR

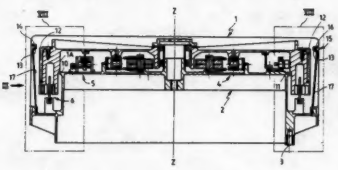
Hubert Vaillant De Guelis, Aubergenville, and Jean-Louis Joly, Bazemont, both of France, assignors to Aerospatiale Societe Nationale Industrielle, Paris, France

Filed Aug. 3, 1988, Ser. No. 227,932

Claims priority, application France, Aug. 5, 1987, 87 11136

Int. Cl.[4] G01C *19/26*

U.S. Cl. 74—5.1 16 Claims



1. Device for temporarily locking onto a stator a rotor that normally rotates on said stator on magnetic bearings, said device comprising a frustoconical bearing surface near the periphery of said rotor, a complementary frustoconical bearing surface on said stator, a plurality of radially mobile elementary bearing surfaces coupled to said stator, a second bearing surface at the periphery of said rotor, spring means radially urging said plurality of radially mobile elementary bearing surfaces away from said second bearing surface; a cable under tension shaped as an annular loop in a transverse plane radially urging said plurality of radially mobile elementary bearing surfaces in axial engagement with said second bearing surface on said rotor in a direction opposite that in which said frustoconical bearing surface on said stator applies an axial engagement force to said frustoconical bearing surface on said rotor, and a releasing device for releasing tension in said cable whereby said plurality of radially mobile elementary bearing surfaces are radially moved away from said second bearing surface by said spring means.

4,872,358

DRIVING MECHANISM HAVING A PRESSURE MEMBER

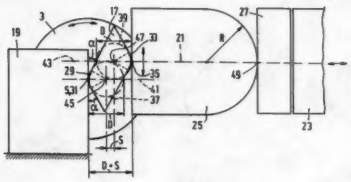
Edwin J. Buis, Veldhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 29, 1988, Ser. No. 161,527

Claims priority, application Netherlands, Jun. 11, 1987, 8701360

Int. Cl.[4] F16H *25/18*

U.S. Cl. 74—99 R 30 Claims



1. A driving mechanism, comprising:

an elongate shaft defining a shaft axis, said shaft being rotatable through a predetermined angle about said shaft axis;

a portion of said shaft defining a cam, said cam portion having first and second opposing surfaces;

a cam follower displaceable along a second axis generally at right angles to said shaft axis and positioned for engaging said cam portion of said shaft, said cam follower having a surface in contact with said second surface of said cam portion; and

support means positioned against said cam portion of said shaft on the side of said shaft opposite said cam follower for preventing displacement of said cam portion in a direction parallel to said second axis and in the direction away from said cam follower, said support means having a surface against which said first cam surface bears;

said first cam surface and said surface of said support means being shaped for providing rolling contact with each other and defining a first roller segment, said first cam surface having a point which coincides with said shaft axis, and

said second cam surface and said cam follower surface being shaped for providing rolling contact with each other and defining a second roller segment,

upon rotation of said shaft and said cam portion, said cam portion in the area of said first roller segment being in rolling contact with said support means, and said cam portion in the area of said second roller segment being in rolling contact with said cam follower, and

said rotation of said cam portion advancing said cam follower along said second axis a distance dependent on the angle of rotation of said shaft and said cam portion, the amount of translation being equal to the distance between a first point of contact between said first cam surface and said support means surface and a second point of contact between said second cam surface and said cam follower surface when projected onto said second axis.

4,872,359

PIVOTATION DEVICE FOR A CENTRIFUGAL CHAIN ASSEMBLY IN A MOTOR VEHICLE

Gerd Schulz, Besselstrasse 9, and Hans-Peter Hertleif, Rotbergskamp 20c, both of 2100 Hamburg 90, Fed. Rep. of Germany

Filed Jul. 21, 1986, Ser. No. 888,458

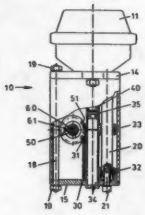
Claims priority, application Fed. Rep. of Germany, Jul. 20, 1985, 3525981

Int. Cl.[4] F16H *21/44*

U.S. Cl. 74—109 17 Claims

1. A pivotation device for adjustably pivoting an arm of a centrifugal chain assembly, said pivotation device comprising:

a drive;
a rack;
means interconnecting said rack and said drive, said rack being longitudinally driveable by means of said drive;
a gear wheel in engagement with said rack;
an output drive shaft driven by a said gear wheel;
the axis of rotation of said output drive shaft coinciding with that of said gear wheel;



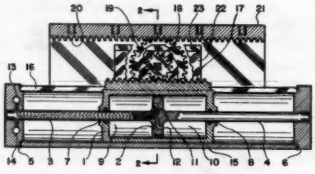
a coupling means adapted to interconnect said output drive and said pivotation arm
a guide rod of circular cross section extending parallel to said rack; and
means interengaging said rack and said guide rod, said rack being guided in a flying manner by said guide rod, said rack having teeth facing away from said guide rod, teeth of said gear wheel cooperating with teeth of said rack to prevent rotation of said rack about said guide rod.

4,872,360

MOVING CYLINDER ACTUATOR

Hyok S. Lew, and Hyon S. Lew, both of 7890 Oak St., Arvada, Colo. 80005

Filed May 12, 1988, Ser. No. 192,835
Int. Cl.[4] F16H *21/44, 27/02;* F01B *15/02*
U.S. Cl. 74—110 **2 Claims**



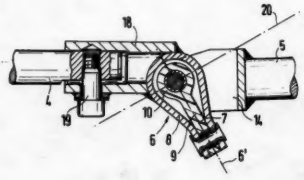
1. An actuator cylinder comprising in combination:
(a) a cylinder including a cylindrical cavity of a constant cross section;
(b) a partitioning member engaging said cylindrical cavity in a sliding relationship and dividing said cylindrical cavity into a first and second compartment in a leak-proof manner;
(c) at least one rod extending from one end face of said partitioning member in a direction parallel to a central axis of said cylindrical cavity and extending through one end wall of said cylindrical cavity in a leak-proof manner, wherein said rod is anchored to a supporting structure at the extremity thereof;
(d) a first port connected to a first flow passage included in said rod and open to said first compartment in the cylinder;
(e) a second port connected to a second flow passage included in said rod and open to said second compartment in the cylinder;
(f) a first rack disposed parallel to the central axis of said cylindrical cavity and affixed to an outer cylindrical surface of said cylinder;
(g) a pinion gear rotatably supported by the support structure and engaged by said first rack, wherein said pinion gear rotates at least another gear having a pitch diameter different from a pitch diameter of said pinion gear; and
(h) a sliding member with fastening means guided and supported by the support structure in a sliding relationship in directions parallel to the central axis of said cylindrical cavity, said sliding member including a second rack engaged by said another gear.

4,872,361

SHIFT ROD FOR A MANUAL TRANSMISSION

Robert Müller, Mönsheim, Fed. Rep. of Germany, assignor to Dr. Ing. h.c.F. Porsche AG, Weissach, Fed. Rep. of Germany

Filed Apr. 5, 1988, Ser. No. 177,927
Claims priority, application Fed. Rep. of Germany, Apr. 2, 1987, 3703290
Int. Cl.[4] G05G *9/18, 7/16*
U.S. Cl. 74—473 R **11 Claims**



1. A shift rod for a gear shift transmission of a motor vehicle of the type that is flanged to an engine unit with the desired transmission gears being manually preselectable and shiftable by means of twisting and longitudinal movements of said shift rod, said shift rod being constructed in two rod segments connected with one another by means of a vibration-damping coupling joint, wherein the coupling joint is housed in a damping body that, in a longitudinal direction of the shift rod, is developed to be softly resilient over a short distance, but that, with a subsequent strong spring progression, is developed to be very stiff with respect to torsion in twisting direction of the shift rod, wherein the damping body comprises a rectangular damping plate and a metal plate that shrouds the damping plate.

4,872,362

DRIVING MECHANISM AND MANIPULATOR COMPRISING SUCH A DRIVING MECHANISM

Nicolaas R. Kemper; Henricus J. J. Bouwens; Marinus P. Koster, all of Eindhoven, and Willem L. G. De Peuter, Oegstgeest, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 136,582, Dec. 22, 1987, abandoned.
This application Mar. 22, 1989, Ser. No. 327,412
Claims priority, application Netherlands, May 18, 1987, 8701183
Int. Cl.[4] F16H *25/24, 55/24;* B25J *17/00*
U.S. Cl. 74—479 **38 Claims**

1. A driving mechanism, comprising:
a spindle defining a spindle axis, said spindle comprising a first threaded portion having multiple helical threads with a lefthand sense and a second threaded portion having multiple helical threads with a righthand sense, said first and second threaded portions occupying separate axial lengths of said spindle, the threads of said first threaded portion having a first thread pitch and the threads of said second threaded portion having a second thread pitch,

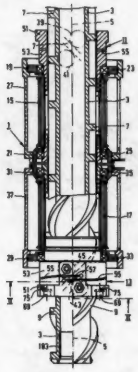
and each thread of said multiple threaded portions having opposing sidewalls;

first and second spindle guides for guiding said spindle for rotation about said spindle axis and translation along said spindle axis, each spindle guide comprising

a sleeve sized for receiving a respective threaded portion with a clearance fit, and

three pairs of rollers arranged on said sleeve for centering and supporting a respective spindle threaded portion within said sleeve, the rollers of each roller pair being spaced from each other and oriented with respect to the spindle axis for guiding a corresponding thread between the rollers of the roller pair and along a helical path relative to said sleeve as defined by the thread pitch of said corresponding thread, and said rollers being rotatably mounted in said sleeve for providing rolling contact with the respective thread sidewalls,

said spindle being inserted into said guides with said first threaded portion engaging said first spindle guide and said



second threaded portion engaging said second spindle guide; and

means for rotatably supporting said spindle guides at a fixed axial distance relative to each other such that each spindle guide guides a respective threaded portion,

whereby for rotation of said spindle guides in the same direction as each other, with the rate of rotation of said first spindle guide relative to said second spindle guide equal to the ratio of said first thread pitch to said second thread pitch, said spindle being rotated without axial translation of said spindle,

for rotation of said spindle guides in the opposite direction of each other, with the rate of rotation of said first spindle guide relative to second spindle guide equal to the ratio of said first thread pitch to said second thread pitch, said spindle being translated along said spindle axis without rotation, and

for other combinations of rotation of said spindle guides, said spindle being translated along said spindle axis and being rotated about said spindle axis.

4,872,363

ELECTRIC POSITIONING APPARATUS

Doy Rosenthal, Rishon Le Zion St. 23, Netanya, Israel 42275

Filed Jan. 16, 1987, Ser. No. 4,098

Claims priority, application Israel, Jan. 20, 1986, 77654

Int. Cl.[4] G05G *11/00*; B25J *17/00*

U.S. Cl. 74—479 **2 Claims**

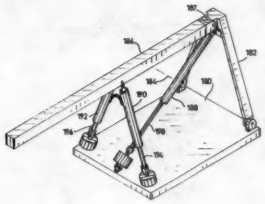
1. Positioning apparatus comprising:

a base,

a non-elongatable first element pivotably mounted onto said base for pivotable positioning relative thereto about a first pivot axis only;

a second element pivotably mounted onto said first element for pivotable positioning relative thereto about two pivot axes one substantially parallel to and one substantially perpendicular to said first pivot axis;

first axially elongatable means mounted pivotably onto said base and pivotably connected to one of said first and second pivotably elements for selectable positioning of said first element about said first pivot axis said first axially elongatable means lying at an angle to a first plane extending through said first element and through said first pivot axis; and



second axially elongatable means mounted pivotably onto said base and said second element at a distance from its pivoting connection with said first element for selectable positioning of said second element with respect to said pivot axis substantially perpendicular to said first pivot axis said second axially elongatable means comprising two axially elongatable elements arranged in a plane generally parallel to said first plane and having elongation axes which are angled with respect to each other and converging towards each other from said base to said second element.

4,872,364

STEERING WHEEL

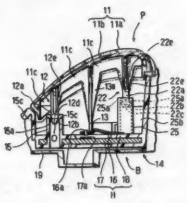
Koichi Kaga; Akio Hosoi, both of Aichi, and Takao Yamaguchi, Nagoya, all of Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed Sep. 20, 1988, Ser. No. 246,640

Claims priority, application Japan, Oct. 27, 1987, 62-164326[U]; Oct. 31, 1987, 62-167169[U]; Oct. 31, 1987, 62-167170[U]

Int. Cl.[4] B62D *1/04*; H01H *9/02*

U.S. Cl. 74—484 H **4 Claims**



1. A steering wheel comprising

a steering wheel body,

a horn pad disposed and held above a boss section of said steering wheel body,

a plurality of hook legs provided on the back side of said horn pad,

a plurality of latch portions provided on said steering wheel body correspondingly to said hook legs,

an urging means disposed between said horn pad and said steering wheel body for urging said horn pad upward,

a horn switch unit disposed between said horn pad and said steering wheel body for actuating a horn when said horn pad is depressed,

a control portion arranged in a rear section of said horn pad when said horn pad depressed, and

a center-of-pivot portion laterally provided in a front section of said horn pad which acts as the center of pivot when said horn pad is depressed.

4,872,365

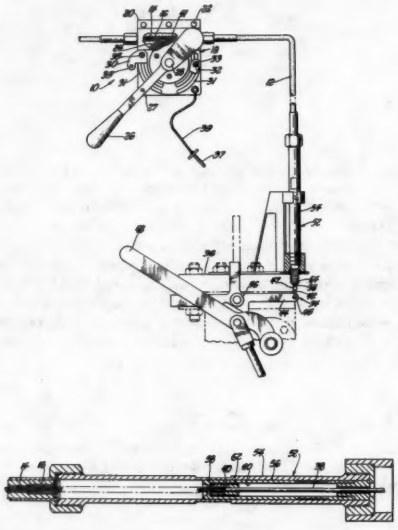
REMOTE ACTUATOR FOR TRIP VALVE

Jeffrey Wolf, Hatboro, Pa., assignor to Teleflex Incorporated, Limerick, Pa.

Filed Jun. 7, 1988, Ser. No. 203,268

Int. Cl.[4] F16K *31/46*; F16L *1/10*

U.S. Cl. 74—501.6 **15 Claims**



1. A motion transmitting remote control assembly **(10)** of the type for transmitting forces in a curved path by a flexible motion transmitting core element **(14)**, said assembly **(10)** comprising:

a conduit **(12)**;

a first flexible motion transmitting core element **(14)** moveably supported by said conduit **(12)**, said first core element **(14)** having a first slug **(58)** disposed on the end thereof;

actuator means **(18)** adapted for attachment to said first core element **(14)** and for imparting movement thereto;

valve trip means remote from said actuator means **(18)** for actuating a valve **(36)** and including a second core element **(38)** having a second slug **(62)** disposed on the end **(40)** thereof;

said assembly **(10)** characterized by lost motion connection means **(52)** including a housing **(54)** secured to said conduit **(12)** and a sleeve **(56)** slideably disposed in said housing **(54)**, said first **(58)** and said second **(62)** slugs slideably engaging and supported by said sleeve **(56)** for establishing a first lost motion connection between said first core element **(14)** and said sleeve **(56)** and for establishing a second lost motion connection between said second core element **(38)** and said sleeve **(56)** said sleeve **(56)** having front and back walls for retaining said first **(58)** and second **(62)** slugs within said sleeve **(56)** so that said first slug **(58)** is moveable relative to said sleeve **(56)** and abuts said front wall of said sleeve **(56)** to move said sleeve **(56)** through a predetermined length in response to a force from said actuator means **(18)** without imparting movement to said second slug **(62)** and said second slug **(62)** is moveable relative to said sleeve **(56)** and abuts said back wall of said sleeve **(56)** to move after said sleeve **(56)** has moved through said predetermined length.

4,872,366

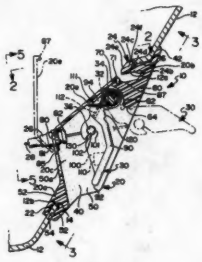
HOOD RELEASE ASSEMBLY WITH INTEGRAL SNAP IN RETENTION AT INSTRUMENT PANEL

John M. Appleby, Warren; James Bolsworth, Sterling Heights, and Charles M. Wilson, Westland, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 29, 1988, Ser. No. 237,480

Int. Cl.[4] F16C *1/10*; E05B *3/00*

U.S. Cl. 74—501.6 **5 Claims**



1. In combination, a passenger compartment panel for an automotive vehicle, such as an instrument panel, having an opening therethrough Whose periphery is defined by upper, lower and side edge portions of said panel, a hood release cable which is adapted to be connected with a hood release latch assembly and a hood release assembly disposed within said opening and attached to said panel, said hood release assembly comprising a one piece housing having upper and lower end portions, side wall portions and a rear wall portion which together define a recess open toward the passenger compartment, said upper end portion including a flange for engaging said panel when attached thereto, a manually manipulatable hood release lever disposed within said recess of said housing and operatively connected with one end of said cable at its end remote from the hood latch assembly, pivot means for pivotally supporting said release lever in said housing for movement about an axis between a first position in which the release member is disposed within said recess and the cable is relaxed and a second position in which the cable is pulled inwardly toward the passenger compartment, and spring means for biasing said hood release lever toward its first position, the improvement being that said lower end portion of said housing has a slot therein for slidably receiving said lower edge portion of said panel and that said upper end portion of said housing an an integrally formed, cantilever snap fastener which extends in a rearward direction away from the passenger compartment and which snap fittingly engages said upper edge portion of said panel when attached thereto, said fastener having a deflectable shank integral with said upper end portion of said housing and a barb integral with said shank at its end remote from said upper end portion of said housing, said hood release assembly being attachable to said panel by sliding said lower end portion of said housing over said lower edge portion of said panel and then moving said upper end portion of said housing toward said panel and with said barb engaging said upper edge portion of said panel to cause said fastener to be

deflected away from its normal free state position until said bar clears said upper edge portion whereupon said fastener returns toward its normal free state position to lock behind said upper edge portion and with the flange on said upper end portion of said housing engaging said panel at its side facing the passenger compartment whereby said hood release assembly is attached to said panel without any need for separate fasteners, said pivot means comprising aligned integral pivot pin ends extending laterally from opposite sides of said release lever, said side wall portions of said housing having aligned openings therein, said pivot pin ends being snap fittingly connected to said side wall portions by being forced into said housing until the pivot pin ends are received without said openings in said side wall portions, and said rear wall portion of said housing comprises a cover integrally hinged to said bottom portion of said housing via a living hinge means, said living hinge means biasing said cover to an open position to permit access from the rear of said housing to said recess, said cover being movable to a closed position in opposition to the biasing force of said living hinge means in which it overlies said side portions of said housing and cooperable detent means on said cover and said upper portion of said housing for snap fittingly retaining said cover in its closed position, said cover being movable to its open position in response to undetenting said detent means.

4,872,367

LOST MOTION END FITTING

Arthur L. Spease, Bloomfield Hills, Mich., assignor to Teleflex Incorporated, Limerick, Pa.

Filed Jun. 17, 1988, Ser. No. 208,147
Int. Cl.[4] F16C *1/10*
U.S. Cl. 74—502.6 **12 Claims**

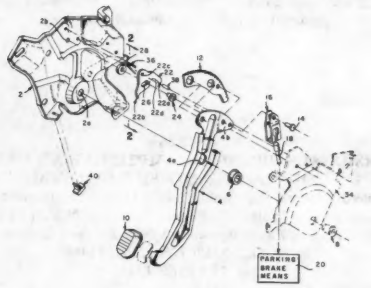
1. A motion transmitting remote control assembly **(10,110)** of the type for transmitting forces along a curved path by a motion transmitting core element **(26,126)**, said assembly **(10,110)** comprising: conduit means **(12,112)**; a tubular member **(22,122)** extending from said conduit means; telescoping means **(24,124)** comprising a tubular telescoping member **(25,125)** and a coupling member **(25,125)** slideably supported by said tubular member **(22,122)** and extending longitudinally outwardly therefrom in the direction of said coupling member **(30,130)** for relative telescoping movement between said telescoping means **(24,124)** and said tubular member **(22,122)** along predetermined overlapping length therebetween; a moveable core element **(26,126)** slideably disposed in said conduit means **(12,112)** and extending through said tubular member **(22,122)** and into said telescoping means **(24,124)**; said assembly **(10,110)** characterized by lost motion connection means disposed within said telescoping means **(24,124)** and connecting said core element **(26,126)** with said telescoping means **(24,124)** for allowing relative longitudinal movement between said core element **(26,126)** and said telescoping means **(24,124)** along said predetermined overlapping length while simultaneously allowing for telescoping movement of said telescoping means **(24,124)** into and out of said tubular member **(22,122)** along said predetermined length.

4,872,368

PUSH-TO-RELEASE CABLE OPERATING APPARATUS

Curtis H. Porter, Moberly, Mo., assignor to Orscheln Co., Moberly, Mo.

Filed Jul. 28, 1988, Ser. No. 225,287
Int. Cl.[4] G05G *5/06*
U.S. Cl. 74—542 **11 Claims**



1. Cable operating means, comprising:

(a) a mounting bracket member **(2)**;

(b) an operating lever member **(4)** adapted for connection with one end of a cable, said operating lever being pivotally connected with said mounting bracket for pivotal movement between cable-released and cable-tensioning positions relative thereto;

(c) pawl and ratchet means for maintaining said operating lever in said cable-tensioning position, including:

(1) a ratchet **(12)** connected with said operating lever member, said ratchet including a plurality of ratchet teeth;

(2) a bifurcated pawl **(22)** having a pair of pawl tips **(22*a*, 22*b*)**;

(3) means including a pivot pin **(24)** mounted on said mounting bracket member connecting said pawl for pivotal movement relative to said bracket member between first (FIG. **2**) and second (FIG. **6**) enmeshed positions in which said pawl tips are in enmeshing engagement with said ratchet teeth, respectively; and

(4) means connecting said pawl for lateral displacement between first (FIG. **2**) and second (FIG. **5**) end positions relative to said pivot pin, said connecting means including a slot **(26)** contained in said pawl for receiving said pivot pin;

(d) overcenter spring means including a toggle spring **(36)** connected between said mounting bracket member and said pawl, said overcenter spring means being alternately operable when said pawl is in said end positions for pivotally biasing said pawl in opposite directions relative to said pivot pin toward said first and second enmeshed positions, respectively, said spring means normally having a first (FIG. **2**) overcenter condition pivotally biasing said pawl in said first direction when said operating lever is in the cable-released position and the pawl is in said first end position, thereby to effect enmeshing engagement between said first pawl tip and said ratchet; and

(e) cam means **(22*d*, 38)** operable solely when said pawl is in said first end and first enmeshed positions and when said operating lever is initially pivoted in the cable-tensioning direction for releasing said first pawl tip from said ratchet and for laterally displacing said pawl toward its second end position (FIG. **5**), whereby said overcenter spring means is operated to a second overcenter condition (FIG. **4**) to pivotally bias the pawl in the other direction toward its second enmeshed position;

(f) said pawl, upon release of said operating lever in the cable-tensioning position and with said pawl in said sec-

ond end and second enmeshed positions being laterally displaced (FIG. 6) toward said first end position, thereby returning said spring means to said first overcenter condition;

(g) said pawl, when in said first end position and in said second enmeshing position (FIG. 6) upon the application of torque to said pawl in said first direction, being pivoted by said spring means directly to said first enmeshing position completely independent of said cam means.

4,872,369

TORSIONAL VIBRATION DAMPER HAVING A ROLL SPUN HOUSING AND OTHER IMPROVEMENTS

Thomas J. Critton, East Amherst, N.Y.; Donald S. Johnson, Fort Erie, Canada; Walter P. Pukalo, Blasdell, N.Y., and Ralph Yorio, Easton, Pa., assignors to Vibratech, Inc., Buffalo, N.Y.

Filed Aug. 3, 1987, Ser. No. 81,003

Int. Cl.[4] F16F *15/10*

U.S. Cl. 74—574 **12 Claims**

5. In a viscous torsional vibration damper of the kind operating on the shear film principle and having an annular channel shaped housing providing an annular working chamber within which is mounted an annular complementary inertia mass ring and a viscous damping fluid substantially filling shear film spaces between working surfaces of the inertia ring and confronting working surfaces of the housing within said chamber;

said housing comprising a roll spun generally channel shaped annular shell having an axially facing base wall and spaced axially extending radially inner and radially outer walls and which walls provide said housing working surfaces;

annular radius corners joining said walls; and

said housing working surfaces having a spinning roll work hardened burnished finish.

4,872,370

PISTON ROD ASSEMBLY INCLUDING PRELOADED PISTON HEAD AND COMPOSITE ROD

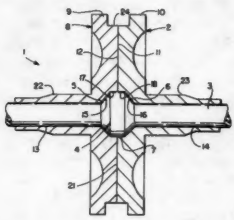
Terry L. Benton, and John H. Matthews, both of Portage, Mich., assignors to Pneumo Abex Corporation, Boston, Mass.

Filed Apr. 6, 1987, Ser. No. 34,841

Int. Cl.[4] G05G *1/00*; F16J *1/00*

U.S. Cl. 74—579 E **14 Claims**

1. A piston rod assembly comprising a piston rod made of fibrous composite material and a metallic piston head, said piston rod having an entrapment ridge intermediate the length thereof, said piston head including two separate sections, and



means for maintaining said piston head sections in preloaded engagement against opposite sides of said entrapment ridge.

4,872,371

AUTOMOTIVE TRANSMISSIONS

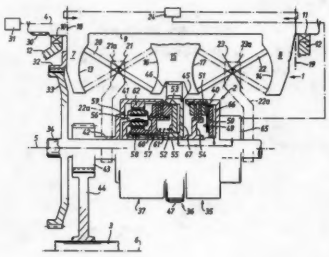
Thomas G. Fellows, 1 Greenbrook Avenue, Hadley Wood, Barnet, Hertfordshire EN4 OLS, England

Filed Dec. 9, 1987, Ser. No. 130,530

Claims priority, application United Kingdom, Dec. 11, 1986, 8629673

Int. Cl.[4] F16H *15/00, 37/06*

U.S. Cl. 74—690 **10 Claims**



1. A transmission of continuously-variable-ratio type including a variator, presenting an axis of operation and having an input and an output;

a gearing unit, having components including not more than a single epicyclic combination comprising a sun member a planet carrier and an annulus, said gearing unit also presenting an axis of operation and having first and second inputs and output all coaxial with said axis of operation;

a final drive shaft, presenting an axis of operation and connected to said output of said gearing unit;

said variator output and input being connectable with said first and second inputs of said gearing unit respectively;

said variator also presenting first and second radial planes, relative to said axis of operation of said variator and marking the axial extremities of said variator; in which said gearing unit is capable of alternative settings whereby said transmission may operate in two different regimes in at least one of which a geared neutral condition is achieved in which said final drive shaft is at rest but said components of said gearing unit are under drive, in which said axes of operation of said variator and said gearing unit are displaced from but parallel to each other, and in which the entire said gearing unit lies between said first and second radial planes.

4,872,372
CONTROLLER FOR LOCKABLE DIFFERENTIAL TRANSMISSION

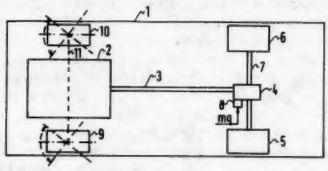
Manfred Bantle, Vaihingen/Enz; Volker Munz, Ludwigsburg; Bernd Zacki, Friolzheim; Matthias Dietz, Bietigheim-Bissingen, and Eberhard Armbrust, Renningen, all of Fed. Rep. of Germany, assignors to Dr. Ing. H.c.F. Porsche AG, Weissach, Fed. Rep. of Germany

Filed Apr. 29, 1988, Ser. No. 188,214

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1987, 3714332

Int. Cl.[4] F16H *1/44*

U.S. Cl. 74—710.5 **17 Claims**



1. An arrangement for the control of the power transmission onto at least one axle of a motor vehicle provided with a lockable differential means, comprising adjusting means for adjusting the locking acting of the lockable differential means, control means for activating by way of the adjusting means the differential means continuously controllable in its locking action in dependence on operating or driving parameters, a power output of an internal combustion engine serving as controlling operating parameter, and the control means acting upon the adjusting means with a first value of a first control magnitude corresponding to a higher locking value up to a power output value lying in a middle range of a power output band available from the internal combustion engine and above this power output value with a second value of a control magnitude corresponding to a lower locking value.

4,872,373
DIFFERENTIAL CONTROL DEVICE

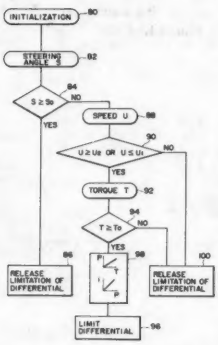
Mitsuyuki Ouchi, and Koichi Aono, both of Susono, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Oct. 22, 1987, Ser. No. 111,264

Claims priority, application Japan, Oct. 24, 1986, 61-252060

Int. Cl.[4] F16H *1/44*

U.S. Cl. 74—711 **14 Claims**



1. A differential control device for controlling the differential of a differential gear having a limited slip differential, comprising:

detecting means for detecting drive torque;

a controller for receiving the detected torque from said detecting means and comparing the size of the detected torque with a predetermined value; and

operating means controlled by said controller to operate said limited slip differential for limiting the differential when the detected torque exceeds the predetermined value,

wherein said controller determines running conditions of a vehicle, compares the size of the detected torque with the predetermined value when certain running conditions have been determined, and then controls the operating means to limit the differential when the detected torque exceeds the predetermined value.

4,872,374
PLANETARY TRANSMISSION APPARATUS HAVING A FOUR ELEMENT TORQUE CONVERTER

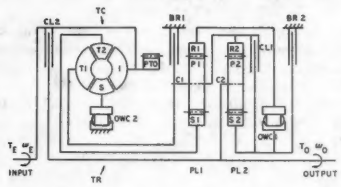
Edward G. Trachman, Birmingham; Shan Shih, Troy, and John Arzoian, Dearborn, all of Mich., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Filed Jul. 3, 1985, Ser. No. 751,401

The portion of the term of this patent subsequent to Oct. 10, 2006, has been disclaimed.

Int. Cl.[4] F16H *47/06*

U.S. Cl. 74—731 **11 Claims**



1. An automatic transmissin apparatus comprising an input shaft, an output shaft, a four element torque converter having an impeller connected to the input shaft, a primary turbine, a secondary turbine, and a stator arranged in fluid flow sequence in which the impeller delivers fluid to the secondary turbine and to the primary turbine and in which the fluid returns from the turbines via the stator to the impeller, first and second planetary gear sets, the first gear set having a first planet gear carrier connected to the primary turbine for turning with the primary turbine and having a first sun gear connected to the secondary turbine for turning with the secondary turbine and having a first ring gear, a one-way clutch connected to the first ring gear, the second planetary gear set having a second ring gear connected to the first planet carrier, a second planet carrier connected to the output shaft, a second sun gear connected to the one-way clutch, a first clutch connected to the second sun gear and to the second ring gear, a first brake connected to the primary turbine, a second brake connected to the one-way clutch and to the second sun gear, and a second clutch connected to the input shaft and to the output shaft.

4,872,375

CONTROL METHOD FOR PLANETARY TRANSMISSION HAVING FOUR ELEMENT TORQUE CONVERTER

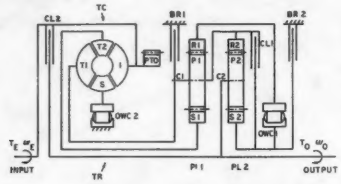
Edward G. Trachman, Birmingham; Shan Shih, Troy, and John Arzoian, Dearborn, all of Mich., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Filed Jul. 3, 1985, Ser. No. 751,402

The portion of the term of this patent subsequent to Oct. 10, 2006, has been disclaimed.

Int. Cl.[4] F16H *47/06*

U.S. Cl. 74—731 **15 Claims**



1. The method of controlling a transmission apparatus having an input shaft connected to an impeller which directs fluid against primary and secondary turbines and which receives return fluid from the stator and which has a first planetary gear set connected to the primary and secondary turbines and a second planetary gear set connected to the first planetary gear set and to an output shaft, comprising braking a one-way clutch connected to a gear in the first planetary gear set and braking a gear in the second planetary gear set and adding power from the primary and secondary turbines in the first planetary gear set to provide a low forward condition.

4,872,376

TRANSMISSION FOR A VEHICLE HAVING IMPROVED PERFORMANCE FOR SHIFTING BETWEEN SPEED STAGES

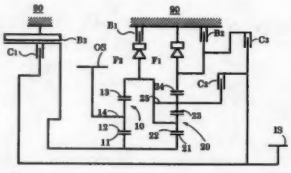
Toshiyuki Asada, Susono; Fumihiro Ushijima, Okazaki, and Yasuhiko Higashiyama, Susono, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Jun. 2, 1988, Ser. No. 201,454

Claims priority, application Japan, Jun. 4, 1987, 62-140660; Jul. 23, 1987, 62-184425; Aug. 3, 1987, 62-194148; Aug. 3, 1987, 62-194149

Int. Cl.[4] F16H *57/10, 3/70*

U.S. Cl. 74—765 **4 Claims**



1. A transmission for a vehicle, comprising:
a housing;
a rotational input member;
a rotational output member;
a single pinion type planetary gear mechanism including a sun gear, a ring gear, a set of planetary pinions and a carrier;
a double pinion type planetary gear mechanism including a sun gear, a ring gear, an inner set of planetary pinions, an outer set of planetary pinions and a carrier, and arranged in a coaxial relation with said single pinion type planetary gear mechanism;
a first, a second and a third clutch;
a first, a second and a third brake; and
a first and a second one way clutch adapted to be engaged only when normally rotationally loaded in normal rotational direction;
said first clutch selectively connecting said input member with said sun gear of said single pinion type planetary gear mechanism and said sun gear of said double pinion type planetary gear mechanism to rotate together around a common central axis thereof, wherein said sun gear of said single pinion type planetary gear mechanism and said sun gear of said double pinion type planetary gear mechanism are connected with one another to rotate together around said common central axis thereof;
said second clutch selectively connecting said input member with said ring gear of said single pinion type planetary gear mechanism and said carrier of said double pinion type planetary gear mechanism to rotate together around a common central axis thereof, wherein said ring gear of said single pinion type planetary gear mechanism and said carrier of said double pinion type planetary gear mechanism are connected with one another to rotate together around said common central axis thereof;
said third clutch selectively connecting said input member with said ring gear of said double pinion type planetary gear mechanism to rotate together around a common central axis thereof;
said first brake and said second one way clutch, when normally rotationally loaded, in series, selectively braking said ring gear of said single pinion type planetary gear mechanism and said carrier of said double pinion type planetary gear mechanism relative to said housing;
said second brake and said first one way clutch, when normally rotationally loaded, in parallel, selectively braking said ring gear of said double pinion type planetary gear mechanism relative to said housing;
said third brake selectively braking said sun gear of said single pinion type planetary gear mechanism and said sun gear of said double pinion type planetary gear mechanism relative to said housing;
said output member being connected with said carrier of said single pinion type planetary gear mechanism to rotate together around a common central axis thereof.

4,872,377

TRANSMISSION RATIO CONTROL SYSTEM FOR A CONTINUOUSLY VARIABLE TRANSMISSION

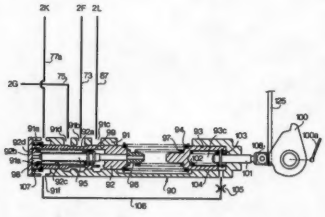
Susumu Nakamura, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 25, 1988, Ser. No. 185,431

Claims priority, application Japan, Apr. 30, 1987, 62-107267

Int. Cl.[4] B60K *41/12*

U.S. Cl. 74—867 **3 Claims**



1. An improved control system for a continuously variable transmission for transmitting the power of an automotive engine to driving wheels of a vehicle, the system comprising a drive pulley having a hydraulically shiftable disc and a hydrau-

lic cylinder for operating the disc, a driven pulley having a hydraulically shiftable disc and a hydraulic cylinder for operating the disc, a belt engaged with both pulleys, a hydraulic circuit having a pump for supplying oil to both the hydraulic cylinders and a drain passage for draining oil in the hydraulic cylinder of the drive pulley, a transmission ratio control valve having a plunger slidably mounted in a valve body, a spool for controlling the oil supplied to the cylinder of the drive pulley and the oil drained from the cylinder to change the transmission ratio, at least one spring provided between the plunger, and the spool, a cam operatively connected with an accelerator pedal of the vehicle, for shifting the plunger of the transmission ratio control valve in accordance with depression of the accelerator pedal, pitot pressure apply means for applying pitot pressure dependent on engine speed to the spool to compress the spring,

wherein the improvement comprises:

stopping means for stopping the cam at a predetermined angular position thereof;

yieldable means provided in a connecting member disposed between the cam and the accelerator pedal for allowing further depression of the accelerator pedal after the stop of the cam;

said stopping means including means for progressively displacing the stopping means as the transmission is upshifted so that the cam is further rotated to compress the spring.

4,872,378

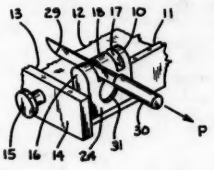
HOLDER FOR KNIFE SHARPENER OR THE LIKE

Robert A. Wrench, 8542 72nd Ave., N.W., Seattle, Wash. 98117

Filed Mar. 22, 1988, Ser. No. 173,561

Int. Cl.[4] A01D *3/00;* **B24B** *3/36*

U.S. Cl. 76—86 **2 Claims**



1. Apparatus holder for use on a drawer having a side and a front, said front having an inside surface,

said holder comprising a body having a top, bottom and afirst side, said bottom of said body being slotted to fit over said side of said drawer with said first side of said body against said inside surface,

whereby said top is accessible and include means for holding sharpening apparatus.

4,872,379

ROCKBIT ARM MACHINING FIXTURE AND METHOD

Eddie L. Eiland, Red Oak, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Jan. 5, 1987, Ser. No. 485

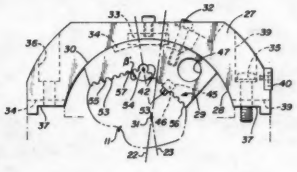
Int. Cl.[4] B23B *33/00*

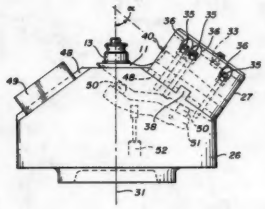
U.S. Cl. 82—165 **14 Claims**

1. A fixture for holding a rockbit arm forging during the machining operations which result in pin angle, ball race height twist angle, offset and pin turn radius, the fixture comprising:

a cap having an interior arcuate surface adapted to rotatably receive a removable vee block;

a removable vee block, having an exterior arcuate surface, first and second interior surfaces, an apex axis corresponding to a predetermined pin angle, the vee block adapted to removably receive a locator; and





a removable locator having a pin, the pin defining a pin turn radius.

4,872,380

WORKPIECE POSITIONER FOR CHUCK AND CENTER MACHINING

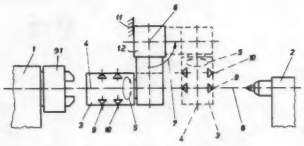
Franz Holy, Stockerau, and Walter List, Enns, both of Austria, assignors to Maschininfabrik Heid Aktiengesellschaft, Stockerau, Austria

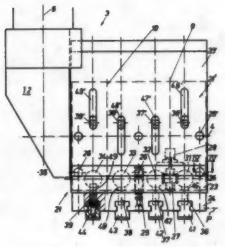
Filed Feb. 18, 1988, Ser. No. 157,849

Claims priority, application Austria, Feb. 18, 1987, 352/87

Int. Cl.[4] B23B *13/00*

U.S. Cl. 82—124 **6 Claims**

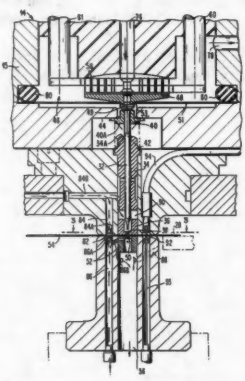




1. In combination with a lathe having a headstock rotatable about a lathe axis, a workpiece positioner comprising:

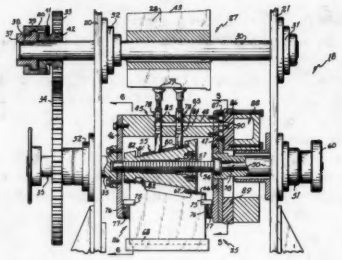
a base adjacent the lathe and defining an upright base axis offset from the lathe axis;
a gripper support pivotal on the base about the base axis and defining a horizontal support axis;
a positioner head pivotal on the support about the support axis;
a pair of grippers each including a respective pair of gripper chuck jaws displaceable on the head transversely of the support axis; and
control means connected to the base, support, head, and grippers for:
during chuck machining, holding the support axis generally perpendicular to the lathe axis and pivoting the gripper about the support axis for loading a workpiece into and taking a workpiece out of the chuck jaws; and
during center machining, holding the support axis generally parallel to the lathe axis and pivoting the gripper about the support axis for loading a workpiece into and taking a workpiece out of the lathe, each gripper including
a pair of jaws movable parallel to each other in a plane;
respective double-acting cylinders adjacent the jaws;
link means coupling each jaw to the respective cylinder for joint movement therewith; and
a synchronizing gear meshing with both cylinders for joint and opposite movement of same, said head including a cylinder plate provided with the cylinders, a jaw plate provided with guides for the jaws, and means releasably linking the plates together.

4,872,381
PROGRAMMABLE MAGNETIC REPULSION PUNCHING APPARATUS
Karl F. Stroms, Wappingers Falls, N.Y., assignor to International Business Machines Corp., Armonk, N.Y.
Filed Jul. 13, 1988, Ser. No. 218,186
Int. Cl.[4] B26D *7/18*
U.S. Cl. 83—76.1 **14 Claims**



1. A punch apparatus for punching hole patterns in thin sheet material comprising;
a housing having a liquid-cooled cavity therein, said cavity containing a liquid cooling medium;
a coil mounted in said liquid-cooled cavity and immersed in said liquid medium;
a driver disk made of a highly conductive material mounted in said liquid-cooled cavity and immersed in said liquid medium, said driver disk mounted adjacent to said coil;
a driver button located outside of said liquid-cooled cavity but in communication with said driver disk;
a punch element for perforating thin sheet material, said punch element aligned with said driver button;
a means for energizing said coil with a pulse of electrical energy for generating flux linking said driver disk and said coil to repel said driver disk from said coil, thereby translating said driver button and said punch element, causing said punch element to perforate a thin sheet of material.

4,872,382
APPARATUS FOR ADJUSTING KNIVES FOR A POUCH FORM, FILL, SEAL MACHINE
Harold T. Benner, Jr., Wyoming, Ohio, and Paul E. Dieterlen, Covington, Ky., assignors to R. A. Jones & Co. Inc., Covington, Ky.
Filed Apr. 18, 1988, Ser. No. 182,516
Int. Cl.[4] B26D *7/06, 1/62;* B65H *61/08*
U.S. Cl. 83—152 **6 Claims**



4. An adjustable knife assembly for a web of filled pouches comprising,
a cage having an axis of rotation,
a screw mounted within said cage on said axis of rotation,
a cone disposed within said cage and mounted on said screw for axial movement upon rotation of said screw, said cone having a conical surface,
a plurality of axially-extending grooves uniformly spaced about the conical surface of said cone,
a radially-extending knife blade slidably mounted in each of said grooves,
means on said cage for supporting each said knife blade in a radial position and blocking axial movement while permitting radial movement,
a plurality of radially-extending suction cup mounts each terminating in a suction cup, said suction cup mounts being uniformly spaced around the circumference of said cage between said knife blades,
said cone having a plurality of axially-extending cup grooves on the conical surface of said cone, said cup mounts each having an inner end slidably-mounted in a respective cup groove,
means on said cage for supporting each said cup mount for radial movement while blocking axial movement,
whereby rotation of said screw causes said cone to move axially with respect to said cage, the axial movement of said cone causing radial movement of said knife blade and said suction cups.

4,872,383
APPARATUS FOR CUTTING TUBULAR KNITTED FABRIC
Katuhiro Niwa; Nobuyasu Abe; Katuji Kajikiyo; Tsutomu Suzuoki; Katumi Tabuti, and Yoshifumi Arii, all of Kyoto, Japan, assignors to Gunze Limited, Kyoto, Japan
Filed Jan. 5, 1989, Ser. No. 293,526
Claims priority, application Japan, Feb. 1, 1988, 63-22229
Int. Cl.[4] B26D *7/14*
U.S. Cl. 83—175 **3 Claims**

1. An apparatus for cutting a tubular knitted fabric wherein

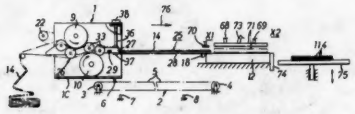
the fabric is transported longitudinally thereof and then cut to the shape of a product by a press cutter, the apparatus being characterized in that the apparatus comprises:

a movable frame reciprocatingly movable longitudinally of the tubular knitted fabric,

a fixed press bed member spaced apart from the movable frame in the direction of transport of the fabric in series with the frame and provided for the press cutter,

at least one pair of upper and lower fabric feed rollers mounted on the movable frame and stoppably drivable in the direction of transport of the fabric,

a tenter core member reciprocatingly movable with the movable frame for tentering the fabric as fitted therearound, the tenter core member having at its one end a portion held by the feed rollers and the other end extending toward the press bed member, and



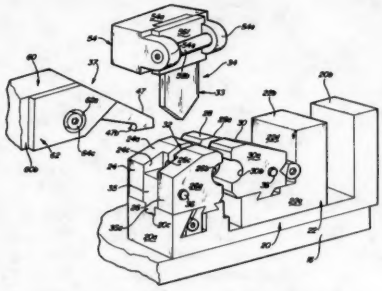
a fabric holding member for releasably pressing the fabric as tentered by the tenter core member against the press bed member, the fabric holding member being provided on the fabric facing side thereof with a cutter blade for the press cutter and elastic pieces having a greater height than the cutter blade and elastically deformable for pressing the fabric against the press bed member before the cutter blade comes into contact with the fabric, the tenter core member being retractable with the fabric pressed against the press bed member by the elastic pieces, the cutter blade being movable in a cutting direction with the fabric pressed against the press bed member by the elastic pieces after the retraction of the tenter core member to cut the fabric by the cooperation of the cutter blade and the press bed member.

4,872,384

TUBE CUTTING APPARATUS

John J. Borzym, 4820 School Bell La., Birmingham, Mich. 48010

Filed Jan. 29, 1988, Ser. No. 149,837
Int. Cl.[4] B23D *21/00*
U.S. Cl. 83—454 **17 Claims**



1. A tube cutting apparatus comprising:

clamping means operative to clamp tubular stock;

a blade holder;

a blade;

a wedge member movable between a locked position in which said blade is locked to said blade holder and a released position in which said blade is released from said blade holder; and

a clamping plate carried by said blade holder and positioned at one side face thereof against said blade;

said wedge member cammingly engaging the other side face of said clamping plate in response to movement of said wedge member to its locked position to clamp said blade upper portion between said blade holder and said clamping plate;

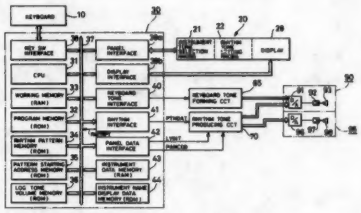
said one side face of said clamping plate and said blade having complimentary inter-engaging teeth which augment the locking action of said wedge member and provide selective vertical adjustment of said blade in said blade holder.

4,872,385

AUTOMATIC RHYTHM PERFORMING APPARATUS WITH MODIFIABLE CORRESPONDENCE BETWEEN STORED RHYTHM PATTERNS AND PRODUCED INSTRUMENT TONES

Shigenori Oguri, and Kosei Terada, both of Hamamatsu, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan

Filed Feb. 13, 1987, Ser. No. 14,706
Claims priority, application Japan, Feb. 14, 1986, 61-28919
Int. Cl.[4] G10H *1/40*
U.S. Cl. 84—635 **4 Claims**



1. An automatic rhythm performing apparatus, comprising:

pattern memory means simultaneously storing a plurality of rhythm pattern data each of which indicates rhythm timings for tones of a corresponding rhythm instrument, each of said rhythm pattern data including a channel designation datum for a corresponding tone generation channel;

rewritable data memory means storing channel alteration data for altering at least one of said channel designation data in said rhythm pattern data;

pattern reading-out means for reading out rhythm pattern data from said pattern memory means;

instrument tone producing means for producing rhythm instrument tones for respective tone generation channels which have been designated by said rhythm pattern data and said channel alteration data; and

data inputting means for rewriting the channel alteration data stored in said rewritable data memory means to alter at least one of said channel designation data in said rhythm pattern data.

4,872,386

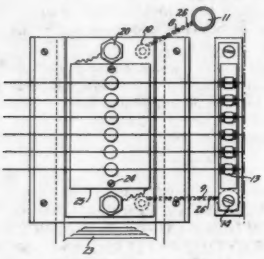
INTERCHANGEABLE PICK-UP FOR ELECTRIC GUITAR

Olivier Betticare, 82 Boulevard Davout, Paris, France (75020)

Filed Jun. 6, 1988, Ser. No. 202,935
Int. Cl.[4] G10H *3/18*
U.S. Cl. 84—726 **4 Claims**

1. In a combination electric guitar body and Interchangeable pick-up element therefor in which the pick-up element is placed in electrical communication with the string bridge of the guitar body upon engagement with said body, the improvement comprising: said guitar body defining a recess, pick-up

mounting means disposed in said recess, said mounting means defining a pair of opposed transversely extending grooves, said pick-up element having a plate having opposed longitudinal edges slidably engaged with said grooves; said pick-up mounting means including conductive terminals, said pick-up element having corresponding terminals selectively engaging said conductive terminals upon engaging said pick-up element in predetermined position relative to said pick-up mounting means.

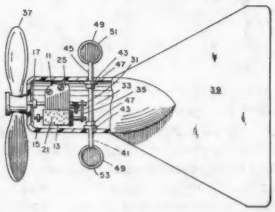


4,872,387

WIND-ACTUATED MUSICAL DEVICE

John Melin, P.O. Box 471, Woodstock, N.Y. 12498

Filed Apr. 25, 1988, Ser. No. 185,879
Int. Cl.[4] G10F *1/06*
U.S. Cl. 84—95.2 **5 Claims**



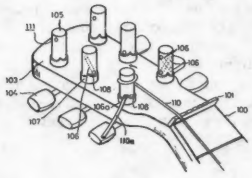
1. A wind-actuated musical device to be suspended between a suspension means, said musical device comprising:
   - a mounting means;
   - a rotatable member having a surface and being rotatably mounted on the mounting means, the rotatable member having an outer surface, pins being affixed in predetermined positions on the outer surface of the rotatable member;
   - a sounding plate mounted on the mounting means and including a series of tines mounted adjacent to the rotatable member so as to be struck by the pins as the rotatable member rotates, the tines being adapted to make musical sounds when struck by the pins;
   - a drive shaft rotatably mounted on the mounting means;
   - means for connecting the drive shaft to the rotatable member to rotate the rotatable member;
   - a wind-actuated impeller rigidly affixed to the drive shaft to rotate the drive shaft; and
   - a support means, including a rod rotatably affixed to the mounting means with a ring at each end for connection to the suspension means.

4,872,388

STRING ANCHORING AND TRIMMING DEVICE

Dennis R. Gunn, Tashiro-so, 2-9-2, Kamiochiai Shinjuku-ku, Tokyo, Japan (161)

Filed Aug. 26, 1987, Ser. No. 89,505
Claims priority, application Japan, Feb. 12, 1986, 61-185115
Int. Cl.[4] G10D *3/00*
U.S. Cl. 84—297 R **26 Claims**



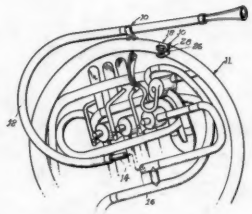
1. A device for securing a filament onto a support member and trimming said filament which comprises:
   - a stationary member which is non-movable relative to said support member;
   - a movable member selectively movable, relative to said stationary member, to a filament securing position from which said movable member cannot be moved relative to said support member, by tension in said filament, in a direction which would cause said filament to become released therefrom;
   - an actuator operable to selectively move said movable member relative to said stationary and support members; and
   - a blade provided on one of said stationary and movable members for cutting said filament when said movable member is actuated toward said filament securing position.

4,872,389

DETACHABLE MOUTHPIPE ASSEMBLY

Lawrence Ramirez, Elkhorn, and Walter Whiteside, Kenosha, both of Wis., assignors to G. LeBlanc Corporation, Kenosha, Wis.

Filed Jan. 9, 1989, Ser. No. 294,871
Int. Cl.[4] G10D *7/10*
U.S. Cl. 84—387 R **9 Claims**



1. A detachable mouthpipe assembly for releasably attaching a mouthpipe to a musical instrument comprising a mouthpipe having a reduced end portion, a receiving aperture for releasably receiving said reduced end portion, said detachable mouthpipe assembly comprising a substantially U-shaped saddle member connected to a predetermined portion of said musical instrument and a swivel screw having a head portion and a shaft, said head portion being pivotally attached to said saddle member, and a slotted arm member attached to a predetermined portion of said mouthpipe and engagable with said swivel screw and said saddle member when said reduced end

portion is releasably secured to said receiving aperture of said musical instrument, and a knob releasably engaging said shaft of said swivel screw and slotted arm member for securing said mouthpipe to said musical instrument.

4,872,390

INSERT BARREL WITH ADJUSTING DEVICE

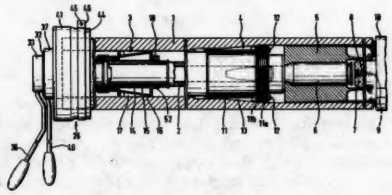
Roland Bertiller, Schramberg; Roland Maier, Dunningen, and Harald Weisser, Oberndorf-Beffendorf, all of Fed. Rep. of Germany, assignors to Mauser-Werke Oberndorf GmbH, Fed. Rep. of Germany

Filed Sep. 2, 1988, Ser. No. 241,021

Claims priority, application Fed. Rep. of Germany, Sep. 3, 1987, 3729412

Int. Cl.[4] F41F *17/06*

U.S. Cl. 89—29 **5 Claims**



1. An insert barrel construction for a main gun barrel, comprising an insert barrel, bearing means rotatably supporting said insert barrel within the main gun barrel, said bearing means including inner and outer eccentric bushings, said inner eccentric bushing arranged within said outer eccentric bushing and being arranged around said insert barrel and supported in the main gun barrel, said inner bushing being rotatable relative to said outer bushing shifting said insert barrel within the main gun barrel, means for supporting said inner and outer eccentric bushings within the main gun barrel including a radially applied clamping bush positioned to engage an interior of the main gun barrel and an expansion bush arranged over said clamping bush and bearing against said clamping bush, said insert barrel having an external shoulder forming a collar, a pressure disk engaged over said insert barrel, a compensating bushing engaged over said insert barrel between said clamping bush and said collar and pin means engageable with said pressure disk for holding said pressure disk against rotation with respect to said insert barrel.

4,872,391

GUN FOR FIRING TELESCOPED AMMUNITION, PLUS SEARING MEANS

Eugene M. Stoner, Palm City, Fla., assignor to Ares, Inc., Port Clinton, Ohio

Division of Ser. No. 58,627, Jun. 2, 1987, abandoned, which is a continuation of Ser. No. 773,585, Sep. 9, 1985, abandoned. This application Dec. 11, 1987, Ser. No. 131,832

Int. Cl.[4] F41D *10/08*

U.S. Cl. 89—155 **15 Claims**

1. A gun for firing cylindrically-shaped, telescoped ammunition, the gun comprising:

(a) a receiver;

(b) a gun barrel and means detachably connecting rearward end regions of the barrel to forward regions of the receiver;

(c) a shell chamber having formed longitudinally therethrough a cylindrical, shell-holding aperture sized to receive a cylindrical, telescoped shell and means mounting the shell chamber in the receiver rearwardly of the barrel for linear sliding movement in a direction orthogonal to a bore axis of the barrel between a shell-loading position in which the shell-holding aperture is out of axial alignment with the bore through the barrel and a shell firing position in which the shell-holding aperture is axially aligned with the barrel bore;

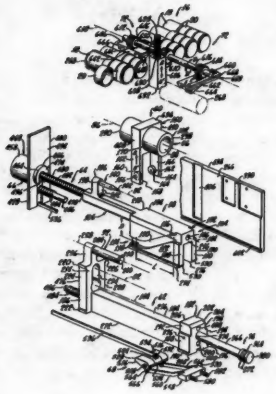
(d) a shell chamber carrier and means mounting the carrier in the receiver for axial sliding movement between a forwardmost, battery position and a rearwardmost position;

(e) means for interconnecting the chamber with the shell chamber carrier so as to cause the shell chamber to be in the shell loading position when the shell chamber carrier is in the rearwardmost position and to be in the shell firing position when the shell carrier is in the forwardmost, battery position;

said interconnecting means including means defining a cam track on the shell chamber carrier and including an interconnecting link, the interconnecting link being connected to the shell chamber and having a cam track follower engaging said cam track; and

said cam track being a generally "S"-shaped recess formed along the shell chamber carrier, and said cam track follower comprising a roller sized to roll along said cam track;

(f) means for causing movement of the shell chamber carrier between the forwardmost, battery position and the rearwardmost position;



(g) means for loading a shell into the shell-holding aperture when the shell chamber is in the shell loading position;

said loading means including shell feeding means for moving a shell into a pickup position rearwardly of said shell loading position and further including shell rammer means for ramming shells forwardly from the pickup position into the shell-holding aperture when the shell chamber is in the shell loading position;

said shell rammer means including a rammer body having a forwardly extending shell rammer fixed thereto and including means mounting the shell rammer means in the receiver for axial sliding movement between a rearwardmost position in which the shell rammer is rearward of a shell in a said pickup position and a forwardmost, battery position in which the shell rammer is rearwardly adjacent the shell chamber when the shell chamber is in the shell loading position and further including means for causing movement of the shell rammer means between the rearwardmost and forwardmost, battery positions;

(h) means for causing firing of a shell held in the shell-holding aperture when the chamber is in the shell-firing position; and,

(i) sear means for searing up the shell chamber carrier and the rammer means when the shell chamber carrier and the

shell rammer means are in their rearwardmost positions and including means for releasing said searing means so as to release the shell rammer means and shell chamber carrier for forward movement thereof.

4,872,392

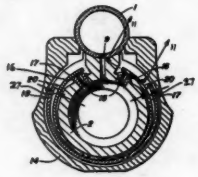
FIREARM GAS RELIEF MECHANISM

Thomas P. Powers, Herkimer, N.Y.; Earl E. Seppala, Hockessin, and James C. Young, Newark, both of Del., assignors to Remington Arms Company, Wilmington, Del.

Continuation-in-part of Ser. No. 106,659, Oct. 13, 1987, abandoned, which is a continuation-in-part of Ser. No. 833,591, Feb. 27, 1986, abandoned. This application Jan. 11, 1988, Ser. No. 142,574

Int. Cl.[4] F41D *5/08*

U.S. Cl. 89—193 **6 Claims**



1. In an automatic firearm having a barrel, a gas cylinder with an initial volume at one end, a piston at one end of the initial volume within the gas cylinder to actuate mechanism for replacing spent ammunition and cocking the firearm, and a bleed orifice connecting the barrel with the initial volume of the gas cylinder, the improvement which comprises at least one gas aperture connecting the initial volume of the gas cylinder with the atmosphere, a leaf spring positioned over the atmospheric side of the aperture to control the flow of gas therefrom, and a shaped geometric body interposed between the aperture and the leaf spring, the shaped geometric body being a body of revolution about a centerline aligned with the aperture, the body interacting with the spring and aperture to form a seal which is a circular line or ring, and wherein the spring is oriented to move in a direction perpendicular to the direction of recoil during the operation to control the flow of gas.

4,872,393

STEERING GEAR WITH RECIRCULATION CHECK VALVE

William T. Rabe, Lafayette, Ind., and Wendell L. Gilbert, Lebanon, Tenn., assignors to TRW Inc., Lyndhurst, Ohio

Filed Jul. 15, 1987, Ser. No. 73,711

Int. Cl.[4] F15B *9/10*

U.S. Cl. 91—375 A **2 Claims**

1. An apparatus comprising:

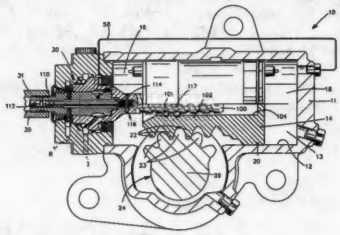
a fluid motor including a housing defining a chamber and a movable piston located in said chamber dividing said chamber into first and second chamber portions;

a rotatable input member;

a rotatable follow-up member associated with said piston, said follow-up member being rotatable in response to movement of said piston in said chamber;

valve means including a cylindrical valve core and a tubular valve sleeve, said valve core being located within said valve sleeve and rotatable relative to said valve sleeve, said valve core being connected with one of said input member and follow-up member and said valve sleeve being connected with the other of said follow-up member and input member, said valve means for controlling pressurized fluid flow to said first and second chamber portions in response to relative rotation between said valve core and said valve sleeve;

conduit means providing fluid communication between said first and second chamber portions, said conduit means including a passage formed in said valve core and said valve sleeve; and



a recirculation check valve located in said passage and having a position in which fluid communication is blocked between said first and second chamber portions and a position in which fluid communication is permitted between said first and second chamber portions upon a loss of fluid pressure and upon rotation of said valve core relative to said valve sleeve.

4,872,394

BENT AXIS TYPE AXIAL PISTON PUMP OR MOTOR

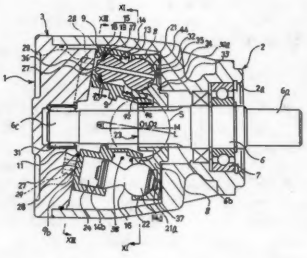
Kazushige Nakagawa; Makoto Koh; Kyoji Sera; Tadashi Ozeki, all of Kyoto, and Masahiro Iwasaki, Shiga, all of Japan, assignors to Shimadzu Corporation, Japan

Continuation of Ser. No. 36,203, Apr. 7, 1987, abandoned, which is a continuation of Ser. No. 704,953, Feb. 25, 1985, abandoned. This application Jan. 28, 1988, Ser. No. 149,896

Claims priority, application Japan, Feb. 29, 1984, 59-38960; Feb. 29, 1984, 59-38961; Mar. 30, 1984, 59-64691; Nov. 12, 1984, 59-238789

Int. Cl.[4] F01B *13/04*

U.S. Cl. 91—506 **11 Claims**



1. A bent axis type axial piston pump or motor comprising:

a casing having at least a pair of inlet-outlet ports;

a shaft rotatable about a first axis and having a portion thereof extending within said casing;

a torque plate mounted on said shaft portion for simultaneous rotation therewith about said first axis;

a cylinder block rotatable about a second axis and provided with a plurality of cylinder bores circumferentially arranged about said second axis, each of said cylinder bores having an axis parallel with said second axis and an opening facing an axial end surface of said torque plate;

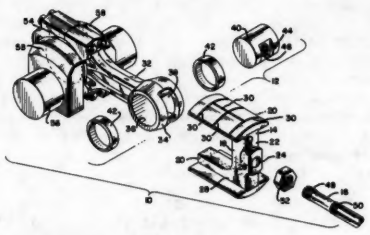
passage means for communicating said inlet-outlet ports with said cylinder bores for transport of working fluid;
means for supporting said cylinder block so that said second axis intersects said first axis;
said shaft passing through said cylinder block without mutual mechanical interference therebetween;
means for rotatably supporting said shaft at the opposite sides of said cylinder block and said torque plate;
a plurality of pistons each slidably inserted into one of said cylinder bores so as to define a chamber therein and having an outer end projecting therefrom;
means for connecting the outer ends of said pistons to said torque plate so as to enable conversion of torque into hydraulic pressure, or vice versa; and
means for synchronizing the rotation of said torque plate and that of said cylinder block, said synchronizing means comprising:
a hollow cylindrical member disposed radially closer to said second axis than said cylinder bores and projecting from said cylinder block toward said torque plate and ending in a plug portion coaxial with said second axis, with said shaft passing through said cylindrical member;
and a socket portion of said torque plate, coaxial with said first axis and receptive of said plug portion, with said plug and socket portions being complementary in shape to enable connection so that they are simultaneously rotatable about said first and second axes and slidable relative to each other about an intersection of said first and second axes.

4,872,395

CROSSHEAD PER SE, AND IN COMBINATION WITH A CONNECTING ROD ASSEMBLY AND A PISTON ROD

Robert A. Bennitt, and Alan C. Anderson, both of Painted Post, N.Y., assignors to Dresser-Rand Company, Painted Post, N.Y.

Filed Nov. 23, 1987, Ser. No. 124,266
Int. Cl.[4] F01B *9/00*; F16J *15/18*; F16H *21/22*
U.S. Cl. 92—139 **8 Claims**



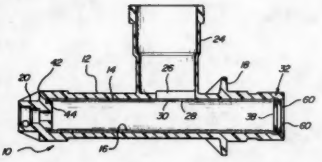
8. In combination, a connecting rod assembly, a crosshead, and a piston rod, comprising:
a crosshead body having only a single borehole formed therein and therethrough;
a connecting rod assembly; and
a piston rod in slidable penetration of said borehole and having an end fastened directly to said connecting rod assembly.

4,872,396

HYDRAULIC CYLINDER WITH LINER AND A RETAINER

Maurice J. Wimbush, Whitnash, England, assignor to Automotive Products, plc, Warwickshire, United Kingdom

Filed Apr. 11, 1988, Ser. No. 180,248
Claims priority, application United Kingdom, Apr. 16, 1987, 8709190
Int. Cl.[4] F01B *11/02*
U.S. Cl. 92—169.1 **25 Claims**



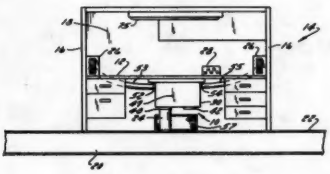
1. A hydraulic cylinder comprising a housing in which a piston is slidably mounted and retention means molded into the housing to provide a surface engageable with a piston retainer member at a position radially inboard of an outer periphery of the retainer member, said surface being provided by shearing a portion of the retention means to provide at least one radially inward projection engageable with the retainer member, the housing and retention means being formed from dissimilar materials.

4,872,397

PERSONAL ENVIRONMENTAL MODULE

Michael G. Demeter, St. Francis; Paul E. Wichman, Brookfield; Linda S. Endres, and Charles E. Rohrer, both of Milwaukee, all of Wis., assignors to Johnson Service Company, Milwaukee, Wis.

Filed Nov. 28, 1988, Ser. No. 276,698
Int. Cl.[4] F24F *7/06*
U.S. Cl. 98—31.6 **20 Claims**



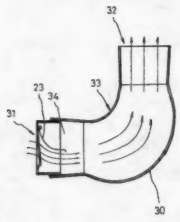
1. A personal environmental module for a work space, said module comprising:
a housing having a pair of air inlets and one or more air outlets positioned to discharge air into the work space,
a controlled damper mounted in each of said air inlets, one of said air inlets being connected to a preconditioned air source and the other of said air inlets being connected to room air,
means mounted in said housing for drawing air through each of said air inlets for discharge through said air outlet, and
baffle means in said housing for mixing the predconditioned air and room air prior to discharge through said air outlet.

4,872,398

AIR VENT THROAT OF INDOOR VENTILATING DEVICE CAPABLE OF PREVENTING NOISE

Hsin-Der Shen, 208, Min Shen West Rd., Taipei, Taiwan

Filed Sep. 14, 1988, Ser. No. 244,034
Int. Cl.[4] F24F *11/02*
U.S. Cl. 98—42.08 **2 Claims**



1. In an improved air vent throat of an indoor ventilating device capable of preventing noise comprising:

an outlet throat coupled between an air exhaust port of said device and a bent windpipe which comprises:

said outlet throat having an inclined hole corresponding to the position of said air exhaust port of indoor ventilating device;

a concave check valve pivotally installed on said outlet throat at the top of said inclined hole capable of making the air easily flow out of the device but impossible flow into the device when the indoor ventilating device stops running;

said check valve tightly closes said inclined hole as a whole via its own gravity;

said bent windpipe inwardly extended and gradually enlarged from an air inlet end connected to said outlet throat and then outwardly extended and gradually marging with an air outlet end through a bent portion of said bent windpipe so as to be an air flow connecting and shifting device to exhaust the air flow as a Laminar to avoid the noise derived from the air vibration;

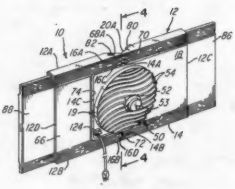
said concave check valve inside said outlet throat includes a concave arched surface outwardly projected in the air flowing out of said bent windpipe and inwardly recessed in the direction of said indoor ventilating device.

4,872,399

CONVERTIBLE FAN ASSEMBLY

David B. Chaney, Powell, Ohio, assignor to The W. B. Marvin Manufacturing Company, Urbana, Ohio

Filed Aug. 15, 1988, Ser. No. 232,340
Int. Cl.[4] F24F *7/013*
U.S. Cl. 98—94.1 **19 Claims**



1. A fan assembly convertible between use in a window and use on a desk or floor comprising:

a one-piece support member having a top edge, a bottom edge spaced from said top edge, and two mutually-spaced outer side edges,

said support member comprising a first support panel, a second support panel, and a pair of living hinges connecting said first and second panels to one another along a pivot axis extending perpendicularly to said top and bottom edges and parallel to and intermediate said outer side edges of said support member; and

a fan stationarily mounted on said first support panel;

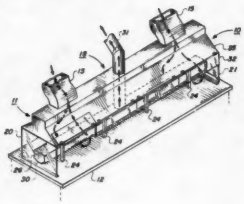
one of said living hinges extending from said fan to said upper edge of said support member and the other of said living hinges extending along said pivot axis from said fan to said lower edge of said support member, said living hinges being constructed so that said first and second support panels of said support member may be pivoted about said pivot axis to a substantially flat orientation with respect to each other for use in a window or may optionally be pivoted about said pivot axis to a folded orientation with respect to each other for use on a desk or floor with both said outer side edges adapted to rest on a desk top or floor.

4,872,400

LABORATORY WORK STATION WITH CONTROLLABLE ENVIRONMENT

Carlton E. Brown, and Pierre C. de Pagter, both of Tucson, Ariz., assignors to Air Concepts, Inc., Tucson, Ariz.

Filed Dec. 12, 1988, Ser. No. 282,620
Int. Cl.[4] B08B *15/02*
U.S. Cl. 98—115.3 **6 Claims**



1. A laboratory work station having a controllable environment and adapted for installation in combination with a laboratory work bench, said work station comprising: a hood assembly having a housing; a plurality of air supply ducts, an ingress air channel for receiving air from said supply ducts and having a baffle plate in a lower portion and a perforated differential plate for directing air therefrom toward said work bench, said housing having a first and second sloped canopy depending from said air supply ducts in a diverging relationship to each other; lighting means secured to said hood assembly and depending therefrom in nonobstructive relationship to said air flow; support means operatively interposed between said work bench and said hood assembly to maintain said hood assembly in fixed spatial relationship to said work bench; an egress air channel disposed adjacent said work bench and adapted to receive and divert the air flow passing from said hood assembly through said work station into said egress air channel.

4,872,401

DEVICE FOR INPROVING THE FLAVOR OR REMOVING THE PIQUANTE FLAVOR OF FERMENTED PRODUCTS

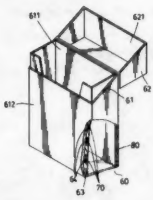
Wen-bin Lee, No. 164, Cheng-Kung Rd., Feng-Yuan City Taichung Hsien, Taiwan

Filed Jul. 5, 1988, Ser. No. 215,335
Int. Cl.[4] A23L *3/32*
U.S. Cl. 99—275 **4 Claims**

1. An apparatus for improving the flavor of and removing the piquante flavor of a fermented substance such as wine, soy sauce, tobacco or the like comprising:

a container including a surrounding side wall; and

a plurality of elongated magnetic members mounted on an inner side of said surrounding side wall, each of said magnetic members having a first pole and a second pole, said first pole of each of said magnetic members being placed adjacent to said first pole of at least one of other adjacent



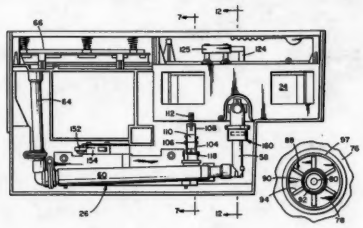
said magnetic members, said second pole of each of said magnetic members being placed adjacent to said second pole of at least one of other adjacent said magnetic members, said magnetic members inducing a magnetic field inside said container.

4,872,402

CARAFE-OPERATED COFFEE BREWING SYSTEM

Paul D. Johnson, Hamden; Robert E. Kubicko; Louis C. Martone, both of Shelton, and Gregory E. Moores, Oxford, all of Conn., assignors to Black & Decker Corporation, Towson, Md.

Filed Jul. 6, 1988, Ser. No. 216,410
Int. Cl.[4] A47J *31/00*
U.S. Cl. 99—280 **25 Claims**



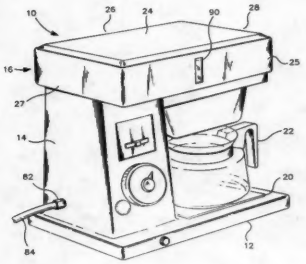
1. Automatic coffee brewing apparatus comprising:
a self-contained water reservoir;
a brewing station;
a water supply conduit in communication with and extending between said brewing station and said water reservoir to enable the flow of water from said reservoir to said brewing station in the course of a brew cycle;
an electrically energizable hot water generator intermediate said brewing station and said operative water reservoir for heating water in said supply conduit to a sufficient extent as it flows from said reservoir to said brewing station to enable coffee to be brewed at said brewing station;
a brewed coffee receiving vessel movable between a withdrawn position and an operative position to receive brewed coffee from said brewing station; and
a carafe switch responsive to the position of said coffee receiving vessel and movable to a closed position for electrically energizing said hot water generator when said vessel is in said operative position and movable to an open position for electrically de-energizing said hot water generator and interrupting the brew cycle when said vessel is in said withdrawn position.

4,872,403

AUTOMATIC COFFEE MAKER

Michael F. LaGesse, and Sally LaGesse, both of #10 Shireford La., Ferguson, Mo. 63135

Filed Feb. 9, 1989, Ser. No. 308,203
Int. Cl.[4] A47J *31/00*
U.S. Cl. 99—280 **5 Claims**



1. An automatic coffee maker comprising:
a vertically oriented housing;
a horizontally oriented base mounted under said housing and having a decanter support portion that extends laterally from said housing and said base having a top surface electric warmer plate mounted thereon;
a water reservoir assembly having a bottom wall, a front wall, a rear wall and laterally spaced side walls extending upwardly from the parameter of said bottom wall;
a removable cover for the top of said water reservoir assembly;
a hot water outlet port in the bottom of said water reservoir assembly at a position vertically above said warming plate, a tubular collar surrounding said hot water outlet port and extending upwardly from said bottom wall;
a cold water outlet port in the bottom wall of said water reservoir assembly at a position vertically above said housing;
a hot water heating chamber mounted in said housing;
a drain tube having its upper end connected to the cold water outlet port of the bottom wall of said water reservoir assembly and its bottom end connected to said hot water heating chamber;
means connected to said hot water heating chamber for delivering a predetermined number of cups of hot water to the hot water outlet port of said water reservoir assembly;
a cup-shaped brewing unit removably mounted to the bottom of said water reservoir assembly below said hot water outlet port;
an elongated cold water tube having its top end in said water reservoir assembly and its bottom end connected to an electric solenoid flow valve;
a water supply tube having a first end and a second end, said second end being connected to said electric solenoid flow valve; and
means connected to said electric solenoid flow valve for measuring a predetermined number of cups of hot water that are delivered to said brewing unit.

4,872,404

PRESS FOR EXPRESSING LIQUIDS FROM SUBSTANCES CONTAINING THEM, ESPECIALLY MUSTS

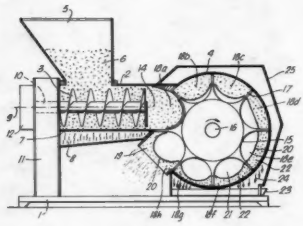
Karl-Heinz Quetsch, Mühlenstr, and Hennig Vetter, Trottstr, both of Fed. Rep. of Germany, assignors to Vetter Maschinenfabrik GmbH, Fed. Rep. of Germany

Filed Nov. 12, 1987, Ser. No. 120,492

Claims priority, application Fed. Rep. of Germany, Nov. 13, 1986, 3638839

Int. Cl.[4] B30B *9/02, 9/22, 9/26*

U.S. Cl. 100—125 **16 Claims**



1. A press for pressing out material in the form of liquid-containing substances, especially musts comprising:

(a) a frame;

(b) carrier means having an axis, being rotatably mounted on said frame and having dividers extending radially to said axis, said dividers forming a plurality of press chambers, said press chambers being sealed against each other and being circumferentially spaced around said axis;

(c) a stationary, at least partially cylindrical sieve wall circumferentially surrounding said carrier means and having at least a plurality of sieve segments and two openings, said sieve segments and said openings being circumferentially spaced around said axis;

(d) radially movably press means disposed in said press chambers and dividing said press chambers into pressure chamber portions disposed radially inwardly, and into press chamber portions disposed radially outwardly and being open radially outwardly;

(e) a charging station coupled to one of said openings of said sieve wall for filling the material into said press chamber portions;

(f) a discharging station coupled to the other one of said openings of said sieve wall for emptying said press chamber portions of the material;

(g) drive means for rotating said carrier means and for placing thereby said press chambers at said charging station or said discharging station, respectively; and

(h) moving means for moving said press means at least radially outwardly and for pressing the material filled into said press chamber portions against said sieve wall.

4,872,405

SYSTEM FOR TINTING CONTACT LENSES

Saul C. Sterman, Jerusalem, Israel, assignor to Med Optics Corp., Panama, Panama

Continuation of Ser. No. 95,206, Sep. 11, 1987, Pat. No. 4,811,662. This application Dec. 27, 1988, Ser. No. 289,939

Claims priority, application Israel, Sep. 16, 1986, 80039

The portion of the term of this patent subsequent to Mar. 14, 2006, has been disclaimed.

Int. Cl.[4] B41F *17/00*

U.S. Cl. 101—44 **6 Claims**

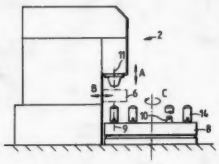
1. A system for tinting contact lenses, comprising:

a transfer-pad printer adapted to pick up a pattern from an inked printing block and transfer said pattern to a contact lens;

at least one lens mount adapted to fixedly hold a soaked contact lens in a defined position, the top surface of said lens mount being convexly curved;

reference means provided on said top surface to facilitate accurate placing of said soaked lens in said defined position; and

menas to produce alignment between said lens mount and said transfer pad prior to said pattern transfer from said pad to said soaked lens;



the radius of curvature of said convexly curved top surface of said lens mount being slightly smaller than the radius of curvature of the base curve in a soaked lens placed on said top surface of said lens mount to facilitate shrinking-on of the back surface of said soaked lens onto said top surface of said lens mount.

4,872,406

DAMPENING MECHANISM FOR OFFSET ROTARY PRINTING PRESSES

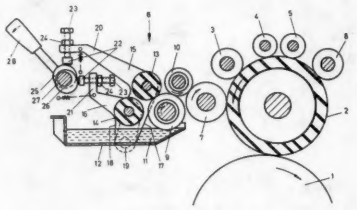
Hans-Jürgen Kusch, Neckargemünd, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen Aktiengesellschaft, Heidelberg, Fed. Rep. of Germany

Filed Sep. 22, 1988, Ser. No. 247,953

Claims priority, application Fed. Rep. of Germany, Sep. 22, 1987, 3731768

Int. Cl.[4] B41F *7/26, 7/40*

U.S. Cl. 101—148 **18 Claims**



1. A dampening mechanism for a rotary printing press including a printing plate comprising:

a rotatable supply roller having a cylindrical surface;

said supply roller rotatable at a speed relative to a printing speed of said printing press;

means for applying dampening fluid to said cylindrical surface during rotation of said supply roller;

means for transferring at least some of said dampening fluid on said cylindrical surface to said printing plate;

a first metering roller having an outer surface with a predetermined first surface characteristic;

a second metering roller having an outer surface with a predetermined second surface characteristic;

means for selectively and alternately causing at least one of said outer surface of said first metering roller and said outer surface of said second metering roller to be in contact with said cylindrical surface downstream of said means for applying said dampening fluid and upstream of said means for transferring;

said means for causing allowing only one of said metering rollers to be in contact with said cylindrical surface at a time.

said outer surface of said first metering roller being in contact with said cylindrical surface for causing a first range of quantities of said dampening fluid to be on said cylindrical surface for transfer to said printing plate by said means for transferring during a first set of operating conditions of said printing press; and

said outer surface of said second metering roller being in contact with said cylindrical surface for causing a second range of quantities of said dampening fluid to be on said cylindrical surface for transfer to said printing plate by said means for transferring during a second set of operating conditions of said printing press.

4,872,407

METHOD FOR THE MOUNTING OF A FLEXIBLE PRINTING PLATE ON A CYLINDER, AND APPARATUS FOR THE EXECUTION OF THE METHOD

Allan Banke, c/o Neoplex A/S, Lyovej 6, DK-5800 Nyborg, Denmark

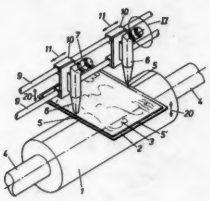
PCT No. PCT/DK88/00034, § 371 Date Oct. 24, 1988, § 102(e) Date Oct. 24, 1988, PCT Pub. No. WO88/06522, PCT Pub. Date Sep. 7, 1988

PCT Filed Feb. 24, 1988, Ser. No. 263,794

Claims priority, application Denmark, Feb. 27, 1987, 1057/87

Int. Cl.[4] B41F *27/00*

U.S. Cl. 101—389.1 **5 Claims**



1. Apparatus for mounting a flexible printing plate on a plate cylinder for a printing machine comprising holding devices for at least one plate cylinder arranged to carry a printing plate with at least one pair of register marks, where the surface of the cylinder or the back of the printing plate is provided with an adhesive coating, wherein parallel with the axis of the cylinder, holding devices are provided with means for securing the printing plate parallel with and without touching the cylinder, and further comprising a number of optical spotting devices at the holding devices, and means for feeding the printing plate towards the cylinder or vice versa, and wherein the holding devices are a two-part table, the two parts of which are provided with vacuum channels with openings towards the table surface, which is plane.

4,872,408

POLYMERIC FILM-ENVELOPED EXPLOSIVE CARTRIDGES AND THEIR MANUFACTURE AND USE

Horst F. Marz, Otterburn Park, Canada, assignor to C-I-L Inc., North York, Canada

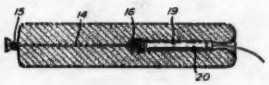
Filed Feb. 1, 1988, Ser. No. 150,979

Claims priority, application Canada, Mar. 25, 1987, 532930

Int. Cl.[4] F42B *3/00*

U.S. Cl. 102—324 **5 Claims**

1. An improved, unyielding, tightly-packed explosive cartridge comprising a tubular, flexible, polymeric film envelope having a first sealed end and a second sealed end and containing a non-rigid explosive composition, the improvement comprising the first sealed end being everted into the body of the cartridge towards the second sealed end so as to provide a central, internal recess, the recess being maintained within the said cartridge body by means of an internal, separate, cord-like tensioner connected between the said second sealed end and



the said everted first sealed end, the length of the said recess being sufficient to accommodate an explosion initiating device so that the said initiating device is substantially surrounded by the said non-rigid explosive.

4,872,409

KINETIC-ENERGY PROJECTILE HAVING A LARGE LENGTH TO DIAMETER RATIO

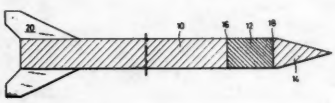
Wilfried Becker, Duesseldorf, and Bernhard Bisping, Ratingen, both of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Duesseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 826,554, Feb. 6, 1986, abandoned, which is a continuation-in-part of Ser. No. 552,271, Nov. 16, 1983, abandoned. This application Aug. 17, 1987, Ser. No. 185,240

Claims priority, application Fed. Rep. of Germany, Nov. 18, 1982, 3242591

Int. Cl.[4] F42B *13/16*

U.S. Cl. 102—517 **5 Claims**



1. A fin stabilized arrow-shaped subcaliber penetrator having a large length to diameter ratio of uniform cross section substantially over its entire length and having a high initial muzzle exit velocity and high kinetic energy to be fired with a sabot out of a large caliber weapon, comprising in combination,

a main body, an intermediate body and a front conically shaped nose body in coaxial alignment with each other; the length of said intermediate body is about 1.5 times as large as its maximum diameter;

said main body comprising between 50% and 70% of the total length of said penetrator;

said main body and said nose penetrator consisting of a tough metal alloy made from the metals of tungsten or depleted uranium and nickel and iron;

said intermediate body consisting of high density brittle sintered alloy which has a high content of tungsten or depleted uranium and a low content of a binding medium;

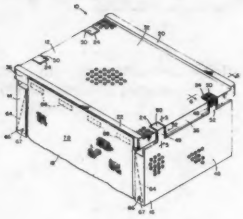
said main body, intermediate body and nose body having abutting butt end faces by means of which they are joined to each other; whereby in use, on impact of the penetrator against a target only the intermediate body fractures into a plurality of relatively small sized particles that widen the hole formed by the nose body impacting against the target beyond the caliber size of the penetrator, thereby to make possible relatively unimpacted travel of the main body through the hole.

4,872,410

FOLDABLE PLAYTRAY

Carol Lilly, 5354 Highland Dr., Bellevue, Wash. 98006

Filed Dec. 21, 1987, Ser. No. 136,117
Int. Cl.[4] A47B *85/00*
U.S. Cl. 108—26 **10 Claims**



1. A playtray comprising:

a table having a play surface which at least substantially comprises a play surface with regularly spaced protruding coupling elements;

a pair of legs, at least one of said legs having a first surface which at least substantially comprises a play surface with regularly spaced protruding coupling elements; and

hinges pivotally connecting said legs to said table in at least first and second configurations;

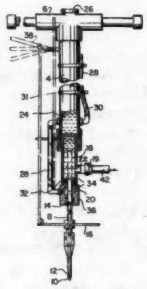
latches operable to selectively lock said legs in said first and second configurations, wherein in said first configuration said leg support said table with said table play surface uppermost, and wherein in said second configuration said legs are outstretched generally coplanar with respect to said table and said first leg surface and table play surface provide the playtray with an extended, substantially unbroken play surface with regularly spaced protruding coupling elements.

4,872,411

APPLICATOR DEVICE

Ernest J. Nagy, 1508-41st Street, SE, Calgary, Alberta, Canada T2A 1K8

Filed Oct. 25, 1988, Ser. No. 262,491
Claims priority, application Canada, Mar. 23, 1988, 562275
Int. Cl.[4] A01C *23/02*; F16K *11/02*
U.S. Cl. 111—7.1 **8 Claims**



1. An applicator device for injecting liquid additives into the soil comprising:

(a) an elongated housing having a handle means connected at one end thereof;

(b) an elongated injector bar, one end of which is slidably secured within means at the other end of the housing to permit the bar to move longitudinally with respect to the housing between open and closed positions and an additive feed position, the other end of the bar having means to permit insertion thereof into the soil, the bar being provided with an exit aperture at said other end and an entrance aperture on the bar between its ends, the bar including a channel extending within the bar between the two apertures;

(c) a carrier liquid chamber in the housing and a carrier liquid supply means in the housing, means communicating the carrier chamber with the carrier supply means said carrier chamber enabling liquid to be passed from the carrier chamber to the channel of the bar;

(d) an additive chamber in the housing beside the carrier liquid chamber in the longitudinal direction; and

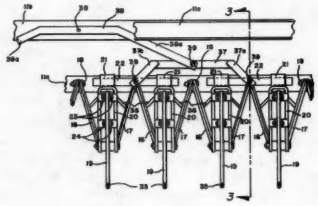
(e) an additive supply means in the housing, means communicating the additive supply means with the additive chamber, the injector bar being longitudinally moveable with respect to the housing allowing the entrance aperture to be in three different positions such that: (a) when the injector bar is in closed position the entrance aperture is sealed off from both the carrier liquid chamber and the additive chamber so that no carrier fluid or additive can flow through the channel, (b) when the injector bar is in open position the entrance aperture communicates with the carrier liquid chamber enabling liquid in that chamber to communicate with the channel, and (c) when the injector bar is in additive supply position, the entrance aperture communicates with the additive supply chamber enabling additive in that chamber to flow to the channel.

4,872,412

FERTILIZER INJECTING IMPLEMENT AND METHOD

Ezra J. Zollinger, 230 E. 3rd South, Logan, Utah 84321

Filed Apr. 18, 1988, Ser. No. 182,435
Int. Cl.[4] A01C *23/02*
U.S. Cl. 111—121 **4 Claims**



1. Agricultural apparatus for the injection of fertilizer into agricultural land comprising a frame adapted for travel across said agricultural land; a series of fertilizer injecting implements mounted in side-by-side ganged relationship on said frame transversely of the direction of travel, each of said implements providing a coulter blade of thin, flat disk formation made of a strong and durable material having smooth surfaces that are substantially of soil non-adherent character, a rigid fertilizer injector tube secured directly behind but in spaced relationship with said blade so as to penetrate to substantially the bottom of cuts in the soil of said agricultural land made by said blade, and structural reinforcement secured to and along the length of said tube for stiffening said tube, both said tube and said reinforcement having smooth surfaces that are substantially of soil non-adherent character; structural means mounting said implements on said frame for blade rotation and ground penetration, said structural means including for each implement a pair of mutually spaced, rearwardly convergent arms that are pivotally fastened to the frame at their forward ends and at whose rearward ends rotatably mount the coulter blade of the implement, and an inverted U fork member for said coulter blade extending upwardly from said rearward ends of said arms; sets

of hanger bars pivotally suspending the forks of the coulter blades of the several implements from the frame, one set of the hanger bars comprising individual hanger bars pivotally secured at corresponding ends to respective yoke bars that are slidably fitted in receiving means of the forks of mutually adjacent coulter blades; means whereby said apparatus may be pulled across said agricultural land; means for carrying a supply of fertilizer to be injected into the soil of said agricultural land as the apparatus travels; and means interconnecting a carried supply of fertilizer with the respective injecting tubes of said implements.

4,872,413

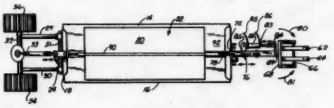
CRAYFISH HARVESTER BOAT APPARATUS

Roland J. Hebert, Rte. 3, Box 1492, Abbeville, La. 70510

Continuation of Ser. No. 850,704, Apr. 11, 1986, abandoned. This application May 19, 1988, Ser. No. 196,723

Int. Cl.[4] B63B *35/14*

U.S. Cl. 114—270 **4 Claims**



1. An apparatus, movable upon land an in water, for harvesting crayfish, comprising:

a. a container portion having side walls and a floor for remaining bouyant on the surface of a body of water;

b. steering means, mounted on the front of the container portion, movable across substantially a 180 degree arc, including a wheel member which makes contact with the bottom of the body of water so that the container portion is steered substantially in the direction of the steering means, the wheel member having a substantially smooth surface for engaging the bottom of the body of water with a minimum amount of friction;

c. power means, including a drive wheel for moving the apparatus at a plurality of speeds, the drive wheel having a plurality of transverse tread plates adhered to its surface for obtaining maximum traction while contacting the bottom of the body of water, mounted substantially on the rear of the container portion for forcibly moving the container portion along the water as the drive wheel makes contact with the water bottom; and

d. means interconnecting the steering means with the container portion and the power means with the container portion for moving the container portion from a first position, substantially at the level of the power means and the steering means, so that the wheels do not make contact with the bottom of the body of water and the container portion floats in the water, to a second position resting above the level of the power means and the steering means.

4,872,414

EMERGENCY SIGNAL BALLOON APPARATUS

Janet L. Asquith, 1247 W. San Marcos Blvd., San Marcos, Calif. 92069, and Bonnie G. Connor, 745 E. Bradley, No. 53, El Cajon, Calif. 92021

Filed Jun. 8, 1988, Ser. No. 203,902

Int. Cl.[4] B64B *1/50*

U.S. Cl. 116—210 **1 Claim**

1. An emergency signal balloon apparatus comprising:

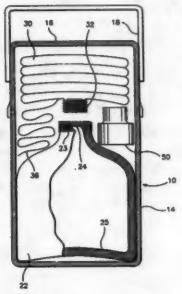
a canister housing having a balloon receptacle portion and an upper receptacle lid portion, a carrying handle attached to said upper receptacle lid portion;

a helium canister having an externally threaded neck having an external diameter D2, said helium canister being removably received in the balloon receptacle portion of said canister housing, said helium canister having a Teflon coating on its inner walls to prevent leakage of helium, a puncture seal closes the neck of the helium canister;

an emergency signal balloon capable of being folded in its deflated state and removably packed in the upper receptacle lid portion of said canister housing, said signal balloon having an externally threaded neck adapter unit connected to its gas inflation port, said externally threaded neck adapter unit having and external diameter D1;

said signal balloon having means thereon for providing a visual signal for help;

valve assembly means for detachably engaging the threaded neck adapter of said emergency signal balloon and the externally threaded neck of said helium canisters to thereby form a fluid passage between said emergency



signal balloon and said helium canister, said valve assembly means consisting entirely of an interiorly threaded tubular upper female coupling unit having an internal diameter D1 and an interiorly threaded tubular lower female coupling unit having an internal diameter D2, said units being connected by horizontal wall structure and a needle valve centrally mounted in a passage through said wall structure for piercing the puncture seal of said helium canister, said valve assembly means having no moving parts; and

a predetermined length of tether line having one end connected to attachment means on said emergency signal balloon, said tether line being removably stored in said canister housing prior to inflation of said emergency signal balloon.

4,872,415

METER FOR A VEHICLE

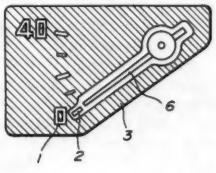
Hiroshi Nakadozono, and Yusuke Mori, both of Kanagawa, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Jan. 22, 1988, Ser. No. 146,863

Claims priority, application Japan, Jan. 23, 1987, 62-14922

Int. Cl.[4] G01D *11/28*

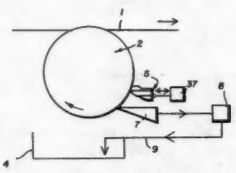
U.S. Cl. 116—288 **8 Claims**



1. A meter for a vehicle comprising:

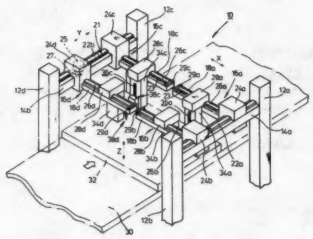
an opaque face;
light means;
a needle for selectively pointing toward a portion of said face, said needle being made of light transmitting material, associated with said light means, and having a shaft which movably supports said needle; and
a reflecting section, provided on said needle, for reflecting light emitted from said light means onto said face so as to illuminate a predetermined area around said portion of the face.

4,872,416
ELASTOMERIC CLEANER FOR GROOVED ROTATING ROLLS
Vernon T. Daniel, Oak Ridge; Jessie Gettliffe, Greensboro, and Tina V. Lorenzo, Jamestown, all of N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.
Filed Jan. 14, 1986, Ser. No. 818,769
Int. Cl.[4] B05C *1/08*
U.S. Cl. 118—203 **4 Claims**



1. Apparatus for applying sizing material to a plurality of textile strands, comprising:
an applicator cylinder having a grooved exterior circumferential surface and mounted for rotation about a first axis;
means for applying melted sizing material to said cylinder so that size lodges in said grooves thereof;
means for rotating said cylinder about said first axis so that size in said grooves is applied to the textile strands each moving past said cylinder and traveling for at least a short distance in a groove; and
means for cleaning the grooves in said grooved cylinder by wiping material that collects in said grooves from said grooves, said cleaning means comprising: a cord of elastomeric material elongated in a first dimension; and means for holding said cord into contact with said cylinder so that the cord is forced into the grooves of said cylinder with the cord elongated in a dimension generally parallel to said first axis, the cord deforming into the grooves so as to effect cleaning of sizing material from the grooves, said holding means comprising: a plurality of holding blocks each having a first end thereof and means defining a channel in said first end for receiving said cord, and means for individually adjusting the positions of said blocks with respect to a housing; each of said holding blocks being linearly reciprocally mounted for sliding movement with respect to the housing, and said means for adjusting the position of each of said holding blocks comprising, for each holding block, a cam slide engaging said holding block at a surface thereof opposite said quadrate channel, and including a slanted surface portion, and an adjustment screw operatively engaging said slanted portion.

4,872,417
METHOD OF AND APPARATUS FOR AUTOMATICALLY COATING A WORKPIECE
Takasi Kuwabara; Takeo Yoshiji, both of Sakado, and Masao Tegawa, Ohmiya, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Jul. 3, 1986, Ser. No. 881,783
Claims priority, application Japan, Jul. 5, 1985, 60-148049
Int. Cl.[4] B05C *3/00*
U.S. Cl. 118—411 **10 Claims**

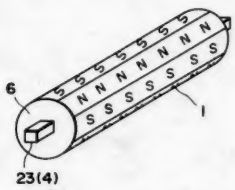


1. An apparatus for automatically coating a workpiece, comprising:
at least one first track;
at least one Y-axis mobile body movable on and along said first track;
at least one second track mounted on said Y-axis mobile body and extending substantially perpendicularly to said first track;
at least one X-axis mobile body movable on and along said second track;
at least one third track mounted on said X-axis mobile body and extending substantially perpendicularly to said first and second tracks;
at least one Z-axis mobile body movable on and along said third track;
a plurality of nozzle devices mounted on said Z-axis mobile body and displaceable so as to be directed toward the workpiece;
actuating means for displacing said nozzle devices with respect to each other on each Z-axis mobile bodies wherein each of said nozzle devices is selectively, automatically displaceable with respect to the other nozzle device on each A-axis mobile body, said nozzle devices having respective nozzles for ejecting different coating materials;
means for selectively and independently operating one of said nozzles for first dispensing a coating material from said nozzle for a predetermined time; and
means for selectively and independently operating the other nozzle device for dispensing a different coating material after termination of the first dispensing.

4,872,418
MAGNET ROLL DEVELOPING APPARATUS
Masao Yoshikawa, Tokyo, and Kimio Nakahata, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Oct. 2, 1986, Ser. No. 914,291
Claims priority, application Japan, Oct. 4, 1985, 60-221495; Oct. 4, 1985, 60-221496
Int. Cl.[4] G03G *15/09*
U.S. Cl. 118—657 **31 Claims**

12. A magnet roll usable for carrying a magnetic developer, comprising:
a main body portion which is solid to the center thereof and which is formed from a rubber in which magnetic material

is dispersed, said main body portion having an outer diameter of not more than 20 mm; and



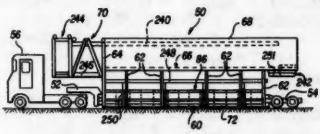
supporting portions projecting out of opposite longitudinal ends of said main body portion, respectively, and made from the same material as the main body portion.

4,872,419

TRANSPORTABLE COATING APPARATUS

Robert L. Blankemeyer, Fort Jennings, and James C. Blankeyemer, Columbus Grove, both of Ohio, assignors to Metokote Corporation, Lima, Ohio

Filed Oct. 29, 1986, Ser. No. 924,515
Int. Cl.[4] B05C *11/00*
U.S. Cl. 118—713 **6 Claims**



1. A transportable coating apparatus comprising

an elongated support structure having lower and upper horizontal rectangular frames, vertical members interconnecting the horizontal frames, and a side longitudinal member mounted on and extending on one longitudinal side of the support structure, each frame including longitudinal members and transverse members interconnecting the respective longitudinal members;

an elongated unitary multi-compartment tank mounted on the lower horizontal frame, said tank including a series of contiguous tank compartments arranged in a straight line longitudinally in the support structure for containing selected treatment and coating fluids;

a first vertically movable horizontal track section extending longitudinally over the series of tank compartments;

means mounted on the support structure for raising and lowering the first vertically movable horizontal track section between raised and lowered positions;

an oven mounted on the upper horizontal frame and extending longitudinally above the series of tank compartments;

said oven including a stationary track section extending longitudinally through the oven;

a front elevator mountable on the support structure at the front end of the series of tank compartments and having a second vertically movable track section and means for raising and lowering the second vertically movable track section between a first position aligned with the stationary track section through the oven and a second position aligned with the first movable track section when the first movable track section is in the raised position;

a rear elevator mounted on the support structure at the rear end of the series of tank compartments and having a third vertically movable track section and means for raising and lowering the third vertically movable track section between an upper position aligned with the stationary track section through the oven and a lower position aligned with the first movable track section when the first movable track section is in the raised position;

a plurality of article carriers with roller means for movably mounting the carriers for horizontal movement on the first, second and third movable track sections and the stationary oven track section;

lower carrier advancing means for incrementally advancing the article carriers from the second movable track section in its second position, along the first movable track section in its raised position, and onto the third movable track section in its lower position;

upper carrier advancing means for incrementally advancing the article carriers from the third movable track section in its upper position, along the stationary track section through the oven, and then onto the second movable track section in it first position;

tank circulation and fluid handling means mounted on the side longitudinal member and connected with at least one of the tank compartments;

said support means including floor engaging means at front and rear ends thereof;

ground engaging wheels means attachable to one end of the support structure for carrying the one end of the support structure with the respective floor engaging means in a raised position;

coupling means attachable to the other end of the support structure and adapted to be connected to a tractor for carrying the other end of the support with the respective floor engaging means in a raised position so that the support structure, the multi-compartment tank, the oven, and the tank fluid handling and circulation means can be transported in an assembled condition over roadways from one location to another location; and

door means separating a front opening of the oven from the front elevator, said door means including a flexible sheet material, and means for unrolling and rolling the flexible sheet material in order to close and open the front opening of the oven;

said unrolling and rolling means including a shaft rotatably mounted at the bottom of the front opening of the oven, a tube rotatably mounted on the shaft, spring means connected between the shaft and the tube and normally biasing the tube in a rotative position to roll-up the flexible sheet, a pair of first sprockets mounted on the shaft at respective opposite ends of the tube, a pair of second sprockets mounted on respective sides at the top of the front opening of the oven, a pair of chains extending on opposite sides of the front opening of the oven and passing over corresponding first and second sprockets of said pairs of first and second sprockets, means attaching one end of the flexible sheet at respective opposite sides to the chains, and reversible motor means for rotating one of the first and second pair of sprockets so that movement of the chains raises and lowers the sheet while rotation of the pipe unrolls and rolls the sheet.

4,872,420

DISPOSABLE CAT LITTER SYSTEM

Daniel R. Shepard, 400 E. 77th St., Apt. 14 J, New York, N.Y. 10021

Filed Aug. 1, 1988, Ser. No. 226,613
Int. Cl.[4] A01K *29/00*
U.S. Cl. 119—1 **3 Claims**

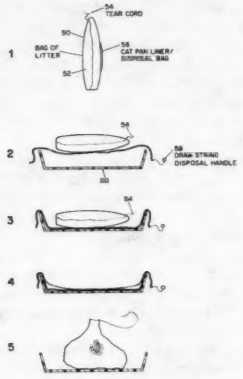
1. A disposable cat litter system comprising:

a litter bag containing cat litter and having at least one generally flat side;

a disposal bag attached to said litter bag side, said disposal bag having an opening large enough to encircle the litter bag and a drawstring means around said opening,

whereby said litter bag can be placed in a cat litter pan with the one bag side downward with the disposal bag opening arranged around the edges of the pan and whereby the

litter bag may be opened to expose said cat litter for use by a cat and after use the drawstring can be used to fully



enclose the litter bag and used cat litter for easy disposal thereof.

4,872,421

METHOD OF ENHANCING MATING IN POULTRY

Sebatian M. Laurent, Greenwall Springs, and Robert N. Sanders, Baton Rouge, both of La., assignors to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 846,188, Mar. 31, 1986, abandoned, which is a continuation of Ser. No. 741,572, Jun. 5, 1985, abandoned, which is a division of Ser. No. 475,370, Mar. 14, 1983, Pat. No. 4,556,564. This application Nov. 24, 1986, Ser. No. 934,458

The portion of the term of this patent subsequent to Sep. 9, 2003, has been disclaimed.

Int. Cl.[4] A23K *1/00*

U.S. Cl. 119—1 **22 Claims**

19. A feed composition for male poultry characterized by having the property of increasing the mating aggressiveness of male poultry when used as the diet for such male poultry, said feed composition containing an amount of zeolite A sufficient to increase the mating aggressiveness of said male poultry when fed thereto on a substantially continuous basis, said amount being from about 0.25 to about 4.00 weight percent of said feed composition, said mating aggressiveness being manifested when said so-fed male poultry is/are exposed to one or more populations of female poultry of the same species.

4,872,422

SCRATCHING AND PETTING DEVICE FOR HOUSEHOLD PETS

Rita A. Della Vecchia, 61909 Dobbin Ct., Bend, Oreg. 97702

Filed Mar. 4, 1988, Ser. No. 164,188

Int. Cl.[4] A01K *13/00*

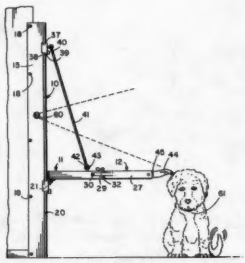
U.S. Cl. 119—83 **8 Claims**

1. A mechanism for scratching and petting household pets comprising in combination:

an elongate base having means for mounting in a vertical position on a structural member;

an elongate "T" shaped petting arm leg extending a spaced distance from the base;

a compound petting arm carried by a petting arm bracket slidably disposed on the petting arm leg of the base and having means for adjustable vertical motion on the petting arm leg of the base, said petting arm being hingeably carried by said petting arm bracket and having an outer arm portion pivotally communicating with an inner arm portion with means to reciprocatably move said outer arm portion through a predetermined arcuate course relative to the inner arm portion; and



a petting element carried by the outermost part of the outer arm portion of the petting arm, said petting element biased to a horizontal position but pivotally movable in a vertical plane against such bias.

4,872,423

METHOD FOR IMPROVING UTILIZATION OF SULPHUR-ABSORBENT WHEN BURNING FUEL IN A FLUIDIZED BED AND A POWER PLANT IN WHICH FUEL IS BURNED IN A FLUIDIZED BED

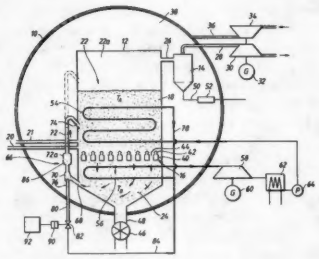
Krishna K. Pillai, Finspong, Sweden, assignor to ABB Stal AB, Finspong, Sweden

Filed Mar. 22, 1988, Ser. No. 171,598

Claims priority, application Sweden, Mar. 25, 1987, 8701229

Int. Cl.[4] F22B *1/00*

U.S. Cl. 122—4 D **4 Claims**



1. A power plant burning a fuel, primarily sulphur-containing coal, in a fluidized bed of particular material comprising:

a bed vessel;

an air distributor with nozzles for blowing air into the bed vessel to effect fluidization of the bed material and combustion of a fuel supplied to the bed, said air distributor dividing the bed vessel into a combustion chamber and an ash chamber;

openings in the air distributor for permitting the bed material to flow from the combustion chamber to the ash chamber;

means in the combustion chamber for cooling the bed material and generating steam;

means for cooling bed material in the ash chamber;

means for withdrawing partly evoled bed material from said ash chamber;

a pneumatic transport means for transporting said withdrawn bed material to said combustion chamber; and

means for supplying said pneumatic transport means with

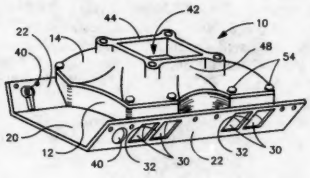
steam constituting both transport gas and a reactant to effect disintegration of absorbent particles.

4,872,424

INTAKE MANIFOLD WITH REMOVABLE BAFFLES

Larry N. Carnes, 1228 Wynkoop, Colorado Springs, Colo. 80909

Filed Apr. 13, 1988, Ser. No. 180,903
Int. Cl.[4] F02B *17/18*; F02M *35/10*
U.S. Cl. 123—52 MV **31 Claims**



1. A manifold apparatus adapted for use with a combustion engine in order to distribute a combustive fuel mixture to a plurality of combustion cylinders in a cylinder block each cylinder having a cylinder intake port located on an intake face of said cylinder block, comprising:

a lower manifold unit mountable on said engine and having lower runner portions and a lower plenum portion;

an upper manifold unit having an intake manifold opening surrounded by a carburetor mounting flange, said upper manifold section having upper runner portions and an upper plenum portion;

said upper and lower manifold units mountable together in an assembled unit whereby said upper and lower plenum portions form a plenum chamber in fluid communication with said intake opening and whereby said upper and lower runner portions form a plurality of intake runners defining fluid flow passageways between said plenum chamber and respective ones of the combustion cylinders, each flow passageway having an outlet port and a surrounding passageway side wall, said assembled unit constructed so that each outlet port is aligned in fluid communication with a respective cylinder intake port; and

baffle means removably mountable as part of the assembled unit for directing flow of the fuel mixture, said baffle means forming a relatively uninterrupted extension of each respective flow passageway.

4,872,425

AIR POWERED VALVE ACTUATOR

William E. Richeson, and Frederick L. Erickson, both of Fort Wayne, Ind., assignors to Magnavox Government and Industrial Electronics Company, Fort Wayne, Ind.

Filed Jan. 6, 1989, Ser. No. 294,730
Int. Cl.[4] F01L *9/02*
U.S. Cl. 123—90.13 **24 Claims**

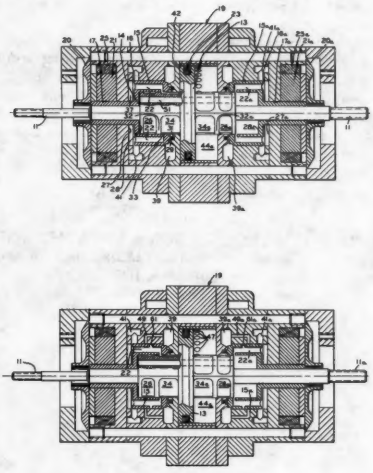
1. An electronically controlled fluid powered power valve actuator for use in an internal combustion engine of the type having engine intake and exhaust valves with elongated valve stems;

said actuator having a power piston having a piston driven side reciprocative along an axis between first and second positions in a housing corresponding to engine valve open and closed positions;

a control valve reciprocative along said axis between open and closed positions for controlling the pneumatic pressure from a pneumatic pressure source to said power piston to move said power piston and said member to said first and second positions;

latching means for closing and holding said control valve in its closed position;

pneumatic pressure control means comprising said source for providing pneumatic pressure to said valve to move said valve towards its open valve position against the holding force of said latching means;



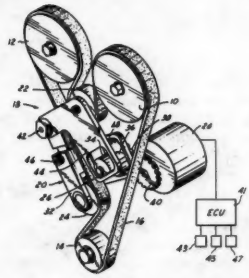
said pressure control means for providing a net pneumatic pressure closing force to said valve after said piston has moved a predetermined distance towards its first position from its second position.

4,872,426

VARIABLE CAMSHAFT TIMING SYSTEM

Samuel J. Sapienza, IV, Hampton, Va., assignor to Siemens-Bendix Automotive Electronics L.P., Troy, Mich.

Continuation of Ser. No. 17,670, Feb. 24, 1987, Pat. No. 4,744,338. This application Apr. 15, 1988, Ser. No. 181,867
Int. Cl.[4] F01L *1/34*
U.S. Cl. 123—90.15 **13 Claims**



1. A variable camshaft timing system in combination with an internal combustion engine having a rotatable member such as a crankshaft, an intake camshaft and an exhaust camshaft, the system comprising:

at least one pulley wheel means fixedly attached to each of the intake camshaft, the exhaust camshaft and the crankshaft;

at least one belt means for interconnecting various ones of said pulley wheel means;

first and second idler arm means independently pivotally attached to the engine, each of said idler arm means having a pivoting arm, a cam follower means and an idler wheel in operative contact with said at least one belt means; and

positioning means operatively coupled to said cam follower means for pivoting said first and second idler arm means and in turn relatively rotating one of said pulley wheel means attached to the intake camshaft with respect to another of said pulley wheel means attached to the exhaust camshaft and for maintaining a predetermined tension in said at least one belt means as said first and second idler arm means are being pivoted.

4,872,427

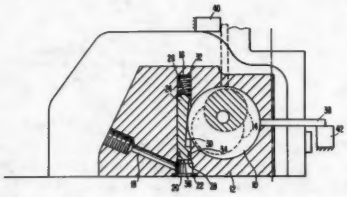
POSITION CONTROLLER FOR A ROTATABLE SHAFT

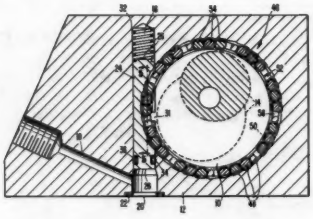
Richard J. Gustafson, Columbus, Ind., assignor to Cummins Engine Company, Inc., Columbus, Ind.

Filed Nov. 29, 1988, Ser. No. 277,644

Int. Cl.[4] F01L *1/34*; F02M *37/04*

U.S. Cl. 123—90.16 **47 Claims**





1. A controller for controlling the rotation and angular position of an internal combustion engine shaft wherein the shaft controls the operation of the intake and exhaust valves of the internal combustion engine to vary the timing of the valving events to optimize engine performance, and wherein the shaft is subject to alternating, opposing, oscillating torques having a non-zero mean value, said controller comprising:

engaging means for engaging the shaft and inhibiting rotation of the shaft in a first direction while permitting rotation in a second direction; and

release means for releasing said engaging means from engagement with the shaft to thereby permit the shaft to rotate in the first direction.

6. A controller for controlling the rotation and angular position of a shaft wherein the shaft is subject to alternating, opposing, oscillating torques, said controller comprising:

engaging means for engaging the shaft and inhibiting rotation of the shaft in a first direction while permitting rotation in a second direction wherein said engaging means comprises a locking surface selectively engageable with the shaft and said locking surface is movable between a disengaged position in which said locking surface does not inhibit rotation of the shaft in the first direction and an engaged position in which said locking surface engages the shaft; and

release means for releasing said engaging means from engagement with the shaft to thereby permit the shaft to rotate in the first direction.

4,872,428

IMPROVEMENTS IN OR RELATING TO DRIVING CONNECTIONS BETWEEN TWO ROTATABLE BODIES

Stephen W. Mitchell, Bury, England, assignor to National Research Development Corporation, London, England

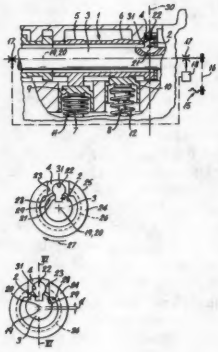
PCT No. PCT/GB88/00376, § 371 Date Jan. 4, 1989, § 102(e) Date Jan. 4, 1989, PCT Pub. No. WO88/08919, PCT Pub. Date Nov. 17, 1988

PCT Filed May 13, 1988, Ser. No. 297,199

Claims priority, application United Kingdom, May 14, 1987, 8711366

Int. Cl.[4] F01L *1/04, 1/34*

U.S. Cl. 123—90.17 **13 Claims**



1. A driving connection between rotatable first and second bodies (1, 3) having parallel but laterally-displacable axes of rotation (19, 20), the first body being hollow and the second body being located within it, in which one of the bodies (3) carries a radial arm (2), in which a radial slideway (23) is formed on one of the bodies (1), in which a block (4) is mounted to slide within that slideway, and in which there is a rotary joint between the block and the outer end (22, 36) of the radial arm, characterised in that a common plane (30, FIG. 1) lying at right angles to the two axes of rotation (19, 20) coincides with all three of the radial arm (2), the block (4) and the radial slideway (23).

4,872,429

METHOD OF MAKING LOW FRICTION FINGER FOLLOWER ROCKER ARMS

Anthony T. Anderson, Romulus, and Nathaniel L. Field, Northville, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 132,740, Dec. 14, 1987, Pat. No. 4,829,647. This application Jul. 18, 1988, Ser. No. 220,714

The portion of the term of this patent subsequent to May 16, 2006, has been disclaimed.

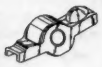
Int. Cl.[4] F01L *1/18*

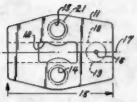
U.S. Cl. 123—90.44 **2 Claims**

1. A finger-follower rocker arm construction, comprising:

(a) a metal channel of medium carbon sheet gauge steel stock, said channel having a web and side walls depending from said web to define a U-shaped cross-section, said side

walls being hinged to said web by embossed grooves in said stock, said side walls having surfaces defining transversely aligned openings, said web having internal wear





surfaces at opposite ends, the edges of said openings and wear surfaces being enhanced in hardness and the remainder of said channel not enhanced in hardness; and

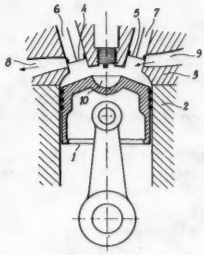
(b) low friction roller assembly journalled in said openings.

4,872,430

VALVE SYSTEM FOR RECIPROCATING ENGINES

Livio Biagini, Bologna, Italy, assignor to B-ART S.r.l., Bologna, Italy

Filed Mar. 29, 1988, Ser. No. 174,716
Claims priority, application Italy, Apr. 6, 1987, 47813 A/87
Int. Cl.[4] F01L *3/00*
U.S. Cl. 123—188 A 21 Claims



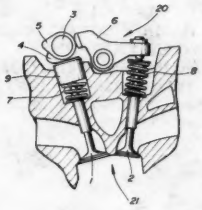
1. A valve system for reciprocating engines, characterized in that it comprises at least two cylindrical guides obtained in the cylinder head; a valve for each guide, which is slidable inside the guide itself without projecting into the inside part of the cylinder; channels or ducts obtained in said cylinder head which put one of said guides and the cylinder itself in communication with the intake or exhaust system following to the motion of the corresponding valve; and sealing means between each one of said valves and the corresponding guide; said valves being provided with a motion that opens the passage of the corresponding channel towards the outside of the cylinder.

4,872,431

INTERNAL COMBUSTION ENGINE WITH CERAMICS VALVES

Shigeaki Akao; Noboru Ishida, and Mitsuyoshi Kawamura, all of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Apr. 27, 1988, Ser. No. 186,841
Claims priority, application Japan, Apr. 28, 1987, 62-65071[U]
Int. Cl.[4] F01L *3/00*
U.S. Cl. 123—188 AA 2 Claims



1. An internal combustion engine comprising:

at least one exhaust valve made of ceramics per each cylinder; and

a plurality of intake valves made of metal per each cylinder;

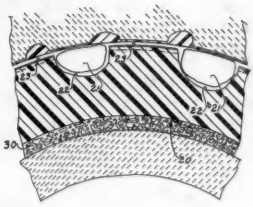
wherein the relation in number and valve head diameter between said intake and exhaust valves are designed so as to give Pe<Pi and De>Di where Pe is the number of said exhaust valves per each cylinder, Pi is the number of said intake valve per each cylinder, De is the valve head diameter of said exhaust valves and Di is the valve head diameter of said intake vavle.

4,872,432

OILLESS INTERNAL COMBUSTION ENGINE HAVING GAS PHASE LUBRICATION

Vemulapalli Durga N. Rao, Bloomfield Township, Oakland County, and Wallace R. Wade, Farmington Hills, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Feb. 23, 1988, Ser. No. 159,615
Int. Cl.[4] F02F *23/00*
U.S. Cl. 123—193 CP 17 Claims



1. In an oilless engine having a piston reciprocal within a cylinder and along an axis of such cylinder while providing an annular gap therebetween to receive combustion gases, a gas phase blow-by control system comprising:

(a) an annular receptacle in at least one of said piston and cylinder;

(b) an annular body of graphite carrying high temperature solid lubricant disposed in said annular receptacle, said body presenting a face projecting out of said receptacle;

(c) an elastomer material retentive of elasticity at the maximum operating temperature to be experienced by said body, interposed between said body and receptacle to

urge said body to close said gap under all operating conditions of said engine; and

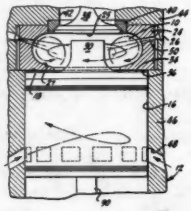
(d) axially directed grooves in said body face sized to substantially trap cylinders of combustion gases therein by viscosity under low pressure gradients and to limit the passage of a combustion gases through said grooves under high pressure gradients to one percent or less of the cylinder gas flow charge volume, the gas cylinders functioning as bearings to ride the piston during reciprocation and provide predominantly gas-phase lubrication.

4,872,433

COMBUSTION CHAMBER CONFIGURATIONS FOR TWO CYCLE ENGINES

Marius A. Paul, and Ana Paul, both of 1100 Orangethorpe Ave., Ste. 140, Anaheim, Calif. 92801

Filed Dec. 7, 1987, Ser. No. 129,453
Int. Cl.[4] F02B *23/02*
U.S. Cl. 123—257 **7 Claims**



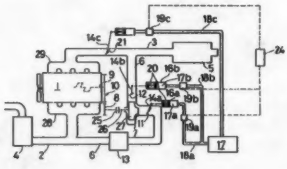
1. A combustion chamber assembly in a two-cycle, internal combustion engine for improving combustion of injected fuel, the engine having a cylinder and at least one piston reciprocatable in the cylinder with the piston and cylinder defining in part a toroidal combustion chamber, the assembly including a plurality of fuel injector nozzles spaced around the cylinder with fuel passages directed tangentially toward the chamber in an arrangement that enhances the toroidal, swirling, compressed air flow during fuel injection, the injector having means for selectively controlling the fuel delivery and fuel timing to each injector nozzle.

4,872,434

ENGINE BRAKE DEVICE

Shigeo Sekiyama, Kawasaki, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan

Filed May 23, 1988, Ser. No. 197,780
Claims priority, application Japan, May 30, 1987, 62-136478
Int. Cl.[4] F02D *35/00, 9/06*
U.S. Cl. 123—320 **9 Claims**



1. An engine brake device for use on an engine having an inlet line and an exhaust line, said brake device comprising:

a bypass line interconnecting said inlet line and said exhaust line permitting intake air to flow from said inlet line to said exhaust line;

a compressor having an output shaft, said compressor rotatably disposed in said bypass line with said output shaft connected to said engine; and

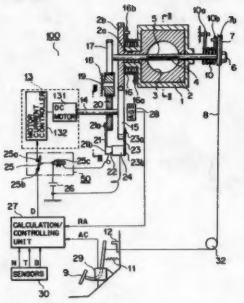
opening and closing means operatively mounted within said bypass line for controlling the flow of air through said bypass line upon braking said engine such that said compressor discharges air induced through said bypass line imposing large negative work on said engine.

4,872,435

THROTTLE VALVE CONTROLLING APPARATUS INCLUDING RELATIVE POSITION LIMITING MEANS FOR THROTTLE VALVES

Yoshiji Ueyama, and Yoshiaki Asayama, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 26, 1988, Ser. No. 236,823
Claims priority, application Japan, Aug. 26, 1987, 62-212531
Int. Cl.[4] F02M *11/04*
U.S. Cl. 123—336 **9 Claims**



1. A throttle valve controlling apparatus for an automobile comprising:

throttle valve means including a first throttle valve and a second throttle valve relatively rotatable to said first throttle valve, for controlling a flow of an air/fuel mixture to an engine of the automobile;

rotating means mechanically coupled to an accelerator pedal, for relatively rotating said first throttle valve with respect to said second throttle valve;

first return spring means for biasing said first throttle valve so as to set the same to a first closed position of said first throttle valve when said accelerator pedal is released;

rotation angle sensor means for sensing an actual rotation angle of said second throttle valve to output a rotation angle signal;

calculation/controlling means for producing a rotation command signal representative of a target rotation angle for said second throttle valves, determined by operation of said accelerator pedal;

electrically controlled actuator means for relatively rotating said second throttle valve with respect to said first throttle valve in response to said rotation command signal derived from said calculation/controlling means in such a manner that deviation between said target rotation angle and actual rotation angle becomes zero;

second return spring means for biasing said closed position of said second throttle valve; and,

relative position limiting means interposed between said electrically controlled actuator means and said calculation/controlling means, for limiting a relative position between said first and second throttle valves within a predetermined rotation range in such a manner that when malfunction of said calculation/controlling means is detected by checking said relative position in said relative position limiting means, supply of said rotation command

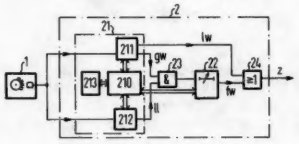
signal from said calculation/controlling means via said relative position limiting means to said electrically controlled actuator means is interrupted.

4,872,436

ARRANGEMENT FOR STABILIZING THE IDLING SPEED OF AN INTERNAL COMBUSTION ENGINE

Helmut Schultes, Gruenthal, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 21, 1988, Ser. No. 247,408
Claims priority, application Fed. Rep. of Germany, Dec. 16, 1987, 3742668
Int. Cl.[4] F02D *41/16*
U.S. Cl. 123—339 **7 Claims**



1. An arrangement for stabilizing the idling speed of an internal combustion engine by early adjustment of an ignition angle, the arrangement having a rotating encoder device that supplies encoder signals proportional to the speed of the internal combustion engine, and having a motor control device that contains a microcomputer to which the encoder signals are supplied and that provided a premature angle therefrom as the ignition angle for a defined idling speed of the internal combustion engine, comprising:

the motor control device having an adjustable timer, whose run-down time (t) is set to a rated time that a reference point (BZ) on a crankshaft of the engine requires for a defined rated idling speed in order to turn from a basic angle (GW) to a defined idling angle (LW) that is the ignition angle at the rated idling speed;

the timer beginning to run down when the reference point (BZ) has reached the basic angle (GW); and

the motor control device containing a logic circuit that, during idling of the internal combustion engine, uses a premature angle (FW), which is the angular position of the reference point (BZ) after the run-down time (t), as the ignition angle when this premature angle (FW) is chronologically reached before the idling angle (LW) and otherwise using the idling angle (LW) as the ignition angle.

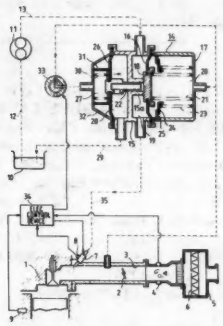
4,872,437

FUEL PRESSURE REGULATOR FOR INTERNAL COMBUSTION ENGINE

Yoshiaki Asayama, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 28, 1988, Ser. No. 212,622
Claims priority, application Japan, Jun. 29, 1987, 62-161667
Int. Cl.[4] F02M *39/00*
U.S. Cl. 123—463 **2 Claims**

1. A fuel pressure regulator (14) for an internal combustion engine for regulating fuel pressure to be supplied to a fuel injection valve (7), comprising: a rigid valve closure member (18) supported by a flexible diaphragm (16) providing a pressure sensitive surface for fuel supplied by a fuel pump (II), a first cylindrical valve seat (15*a*) cooperable with said valve closure member for on-off controlling a fuel recirculating passage (29) to a fuel tank (10), a second cylindrical valve seat (22) slidably supported by and coaxially disposed within said first cylindrical valve seat, said second cylindrical valve seat being similarly cooperable with said valve closure member, and means (30, 33) for moving said second valve seat in a first



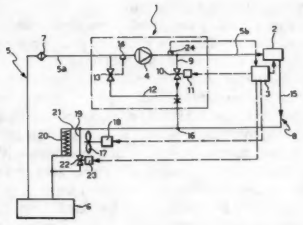
direction towards said diaphragm in accordance with a sensed operating condition of said engine.

4,872,438

FUEL INJECTION SYSTEM WITH CONTROLLED INJECTORS FOR DIESEL ENGINES

Francesco P. Ausiello, Turin; Mario Ricco, Bari, and Sisto Luigi De Matthaeis, Mogugno, all of Italy, assignors to Weber S.r.l., Italy

Filed Aug. 25, 1988, Ser. No. 236,539
Claims priority, application Italy, Aug. 25, 1987, 67735 A/87
Int. Cl.[4] F02M *31/20, 31/16*
U.S. Cl. 123—514 **4 Claims**



1. A fuel injection system with controlled injectors for diesel engines, comprising a .fuel tank, a supply circuit including a pump for conveying the fuel under pressure from the tank to the controlled injectors, and a circuit for recycling the fuel to the tank, including a return line from the pump in which a solenoid pressure regulating valve is inserted, and a return line from the injectors which is joined by the return line from the pump, including a system for regulating the temperature of the fuel, including:

preheating means including a branch line (12) which connects the return line (9) from the pump (4) downstream of the solenoid pressure-regulating valve (10, ii) with the supply circuit (5*a*) upstream of the pump and a cut-off valve (13) having a thermostatic control (14) and arranged to allow the fuel to flow through the branch line (12) when the temperature of the fuel upstream of the pump (4) is below a predetermined threshold value and to stop this flow when the temperature exceeds the threshold value, and

cooling means including means (24) for sensing the temperature of the fuel in the supply circuit (5*b*) downstream of the pump (4) and upstream of the return line (9) from the pump (4), electrically-controlled cooling means (17, 18;

20, 21, 22, 23) associated with the return line (15) from the injectors (2) downstream of the return line (9) of the pump (4), and an electronic unit (S) for controlling the cooling means in response to signals provided by the temperature sensor means (24).

4,872,439

DEVICE FOR PREVENTING OUTFLOW OF A FUEL VAPOR FROM A FUEL TANK

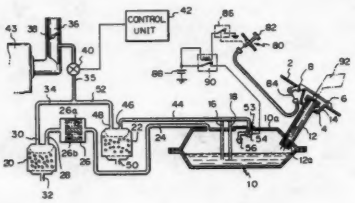
Hidefumi Sonoda; Eiji Mori; Mitsuo Kawase; Kazuhiro Yoneshige, all of Aichi; Akira Takahashi, Saitama; Hirokazu Komiya, Tokyo, and Akira Tanaka, Saitama, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha; Aisan Industry Co., Ltd., both of Aichi and Jeco Co.,Ltd., Saitama, all of, Japan

Filed Feb. 1, 1988, Ser. No. 151,182

Claims priority, application Japan, Feb. 2, 1987, 62-20514; Feb. 2, 1987, 62-12750; Feb. 2, 1987, 62-20513; Feb. 2, 1987, 62-12751; Feb. 2, 1987, 62-12755

Int. Cl.[4] F02M *59/00*

U.S. Cl. 123—518 **20 Claims**



1. A device for preventing fuel vapor from escaping into the outside air from a fuel tank, said device comprising:

a fuel vapor purifying apparatus;

a float-valve assembly mounted on an upper wall of the fuel tank and having therein a breather passage which is open to an upper interior of the fuel tank at one end and is connected to an upper interior of the fuel tank at one end and is connected to said fuel vapor purifying apparatus at the other end, said float-valve assembly having a normally closed solenoid valve which is arranged in said breather passage and having a float which operates with said one end of said breather passage and closes said one end of said breather passage when the level of a surface of fuel in the fuel tank exceeds a predetermined level; and

control means for determining whether said solenoid valve is to be opened and opening said solenoid valve when said solenoid valve is to be opened, said control means comprising an ignition switch and a control switch, said control switch being operated when replenishment of the fuel tank is to be carried out, and said solenoid valve being opened when said ignition switch is off and when said control switch is operated.

4,872,440

AIR AND FUEL MIXING DEVICES FOR INTERNAL COMBUSTION ENGINES

Kenneth L. Green, 1070 NE. 1st St., Miami, Fla. 33138

Filed Oct. 18, 1988, Ser. No. 259,315

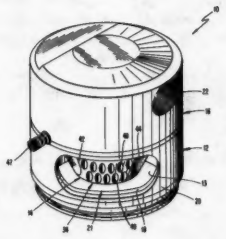
Int. Cl.[4] F02M *29/00*

U.S. Cl. 123—590 **13 Claims**

1. A fuel and air mixing device for use with an internal combustion engine, comprising:

ring means positionable adjacent an air/fuel intake of an engine and defining an interior volume for the mixing of fuel and air, said ring means including air inlet passage means arranged in a cylindrical periphery of said ring means, and

a mixer body comprising a plurality of fuel passages each having an inlet and outlet, said inlets communicating with a fuel source, said outlets communicating with said interior volume such that a flow of air into said interior volume and across said fuel passage outlets draws fuel through said fuel passages and into said interior volume to be mixed with the air,



said ring means including a stationary part and a movable part for adjusting the size of said air inlet passage means for regulating the amount of incoming air.

4,872,441

IGNITION CIRCUIT FOR INTERNAL COMBUSTION ENGINE

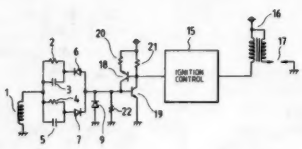
Masayuki Ozawa, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 10, 1988, Ser. No. 205,244

Claims priority, application Japan, Jun. 10, 1987, 62-89823[U]; Jun. 10, 1987, 62-89824[U]; Jun. 10, 1987, 62-89825[U]

Int. Cl.[4] F02P *3/12*

U.S. Cl. 123—651 **4 Claims**



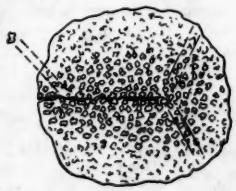
1. An ignition circuit for an internal combustion engine, comprising: a signal coil (1) for producing an alternating angle signal in synchronism with the engine rotation, a bistable circuit responsive to said angle signal for providing an output having a first level and a second level corresponding to positive and negative portions of said angle signal, respectively, and an ignition control circuit (15) responsive to said output of said bistable circuit for calculating a desired ignition timing and controlling a current supply to an ignition coil (16), said bistable circuit including, exclusively, a semiconductor transistor (19) having a base electrode input connected to directly receive said angle signal and a collector electrode connected to a power supply through a resistor (21), an output connected to said ignition control circuit, and a positive feedback circuit, comprising an active circuit element (18; 29; 31) and a resistor (20; 30), connected in series between said collector electrode and said base electrode.

4,872,442

ACTIVATOR FOR INITIATING REACTION IN A HEAT PACK AND METHOD FOR MAKING SAME

Charles F. Manker, Chicago, Ill., assignor to Prism Technologies, Inc., Chicago, Ill.

Filed Sep. 6, 1988, Ser. No. 241,086
Int. Cl.[4] F24J 1/00
U.S. Cl. 126—263 6 Claims



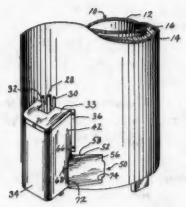
1. An activator for reliably initiating crystallization of a super-cooled aqueous salt solution, said activator being formed of a flexible, relatively thin metal, having at least one slit extending therethrough and with the opposing sides of said slit being in contact along at least a part of the length of said slit, and said activator having a number of minute metal nodules attached to and protruding from the surface thereof and adjacent to said slit, said nodules being adapted to be detached from said surface upon flexing of said activator.

4,872,443

WATER HEATER WITH POWER VENT ACCESS DOOR

Darryl L. Ruark, Lugoff, S.C., assignor to A. O. Smith Corporation, Milwaukee, Wis.

Filed Mar. 13, 1989, Ser. No. 322,686
Int. Cl.[4] F24H 1/00
U.S. Cl. 126—361 22 Claims



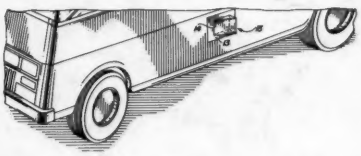
1. A water heater comprising an inner storage tank, an outer cylindrical jacket spaced outwardly of said tank, an access opening through a lower portion of said jacket, a power vent enclosure extending outwardly and forwardly from said jacket and covering a portion of said access opening, said power vent enclosure having a sidewall extending radially outwardly and forwardly from said jacket, said sidewall having an opening therethrough extending radially outwardly and forwardly from said jacket at said access opening, an access door mounted to said water heater and covering both said sidewall opening and the remainder of said access opening not covered by said power vent enclosure.

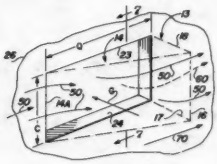
4,872,444

WIND DEFLECTOR SHIELD FOR WATER HEATER COMPARTMENT

Richard T. Dervin, 1302 West Anderson Dr., Phoenix, Ariz. 85023

Filed Dec. 16, 1988, Ser. No. 285,130
Int. Cl.[4] F24H 1/00
U.S. Cl. 126—361 3 Claims





1. In combination with a ventilation opening formed through an exterior access door to a closet in a vehicle housing a gas heated water container, the ventilation opening

including spaced apart elongate opposed top and bottom boundary edges,

including a pair of spaced apart elongate side boundary edges each interconnecting said top and bottom boundary edges,

being circumscribed by an outer surface exposed to the ambient air and by an inner surface adjacent said water container,

a deflector shield folded from a blank including

(a) a body panel including first and second spaced apart opposing side edges;

(b) first and second triangular side panels each having a pair of diverging edges intersecting a third common edge, one of said diverging edges of each of said side panels being attached to said body panel along an opposite one of the pair consisting of said first and second edges; and,

(c) first and second elongate feet each having a longitudinal axis and connected to the other of said diverging pair of edges of an opposite one of said side panels;

said blank being folded along said first and second side edges and along the other of said diverging pair of edges of each of said first and second side panels to form said deflector shield, said shield including

(d) said triangular side panels extending outwardly from said body panel in spaced apart, opposed relationship, and

(e) said elongate feet each extending outwardly from one of said side panels and from the area bounded by said opposed, spaced apart side panels, said feet extending outwardly from said opening and contacting said inner wall to prevent said shield from being outwardly pulled through said opening,

said side panels extending outwardly through said opening to said body panel,

said body panel and said one of said diverging pair of edges of each of said side panels of said shield sloping outwardly away from said opening to form a channel which permits air to flow through said opening outwardly from said vehicle in a selected direction of travel, said sloped body panel deflecting away from said opening air flowing adjacent said outer surface and against said body panel in said selected direction of travel.

4,872,445

COOKING UTENSIL

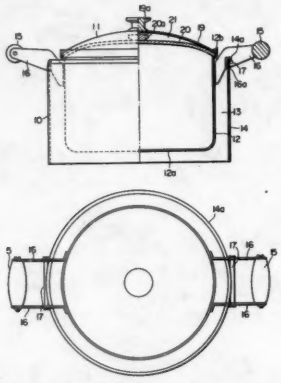
Hiroshi Kobayashi; Masae Kobayashi, both of Kodaira, and Haruhiko Machida, Tokyo, all of Japan, assignors to Techno-Frontier Ltd., Kodaira, Japan

Filed Jun. 29, 1988, Ser. No. 212,781

Claims priority, application Japan, Jun. 29, 1987, 62-99964[U]; Dec. 17, 1987, 62-191617[U]

Int. Cl.[4] A47J *27/10*

U.S. Cl. 126—376 **8 Claims**



1. A cooking utensil which comprises

an inner vessel portion;

an outer shell portion having an inside diameter larger than that of the inner vessel portion and a height as same as or longer than that of the inner vessel portion, said outer shell portion having a cylindrical shape and

a lid which closes an opening of the inner vessel portion, and a space portion being defined by said inner vessel portion and said outer shell portion, said inner vessel portion and said outer shell portion being combined or connected by a pair of hand grips, wherein each of said hand grips is secured to the outer peripheral surface of the inner vessel portion adjacent to the upper and thereof in diametrically opposite relation, each of said hand grips having plate-like plate arm portions, said plate-like plate arm portions including a recess portion at a mean portion thereof and an engaging shaft provided on an outer side of the recess portion of the platelike arm portion which engages a reinforced flange of the outer shell portion.

4,872,446

ENDOSCOPE WITH COLOR CORRECTING MECHANISM

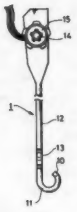
Moriyoshi Murata, Tochigi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 16, 1988, Ser. No. 245,240

Claims priority, application Japan, Sep. 25, 1987, 62-238829

Int. Cl.[4] A61B *1/06*

U.S. Cl. 128—6 **11 Claims**



1. An endoscope, comprising:

a scope including a bendable viewing head portion, the top of which can be deflected to view a side wall of the scope;

imaging device means at the top of the bendable head portion for imaging an object of interest in terms of electric signals;

white sheets on the side wall which can be viewed by the imaging device means and which are wide enough to fill most of a single view of the imaging device means;

camera control units means for converting electric signals from the imaging device means to image signals;

color correction unit means for performing color correction on the image signals; and

display means for displaying images of the object of interest.

4,872,447

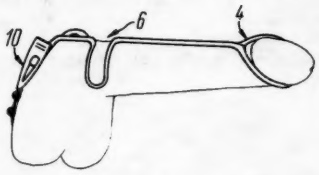
METHOD FOR TREATMENT OF SEXUAL IMPOTENCE IN MEN

Moisei V. Tsirjulnikov, and Zinovy A. Zusmanovsky, both of Leningrad, U.S.S.R., assignors to Vseojunzy Nauchno-Issledovatelsky 1 Ispytatelny Institut Meditsinskoi Tekhniki

Filed Mar. 11, 1988, Ser. No. 166,678

Int. Cl.[4] A61F *5/41*

U.S. Cl. 128—79 **2 Claims**



1. A method for treatment of sexual impotence in men, comprising an external fixing of the penis with the aid of mechanical means followed by rehabilitation of the sexual potency which is carried out by a stage-by-stage displacement of the points of fixing towards the root of the penis, thus increasing the length of the penis portion free from fixing and accompanied by regulation of the regional blood flow through the penis by way of mechanical action exerted thereon at the points of fixing.

4,872,448

KNEE BRACE HAVING ADJUSTABLE INFLATABLE U-SHAPED AIR CELL

Glenn W. Johnson, Jr., 10 Friar Tuck Cir., Summit, N.J. 07901

Continuation-in-part of Ser. No. 921,858, Oct. 22, 1986, abandoned, which is a continuation of Ser. No. 483,448, Apr. 11, 1983, abandoned. This application May 19, 1987, Ser. No. 51,360

Int. Cl.[4] A61F *5/04*

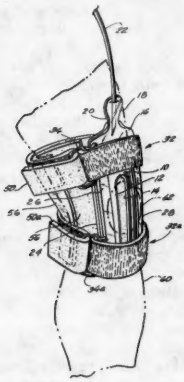
U.S. Cl. 128—80 C **18 Claims**

1. A knee brace comprising first adjustable means for engaging the knee and providing support to the patella without hindering normal tracking movement thereof, second adjustable means for fastening said first means in engagement with the knee, third adjustable means for providing support to the infra patella region of the knee,

wherein said first adjustable means comprises a flexible, semi-compressible support member, said flexible, semi-compressible support member comprising a base portion and a pair of depending arm portions thereby generally forming a U-shaped configuration, said support member being adapted for engagement with said knee such that the base portion engages the knee proximally above the patella and each of said arm portions engages the knee on opposed sides of the patella, respectively, and

wherein said third adjustable means comprises a second

flexible, semi-compressible support member at least a portion of which is adapted to be disposed between at



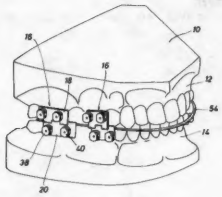
least one of said arm portions and the infra patella region of the knee.

4,872,449

QUICK-RELEASE DEVICE FOR JAW STABILIZATION

Reinier Beeuwkes, III, Ardmore, Pa., assignor to Medical Products & Research, Houston, Tex.

Filed Sep. 16, 1987, Ser. No. 97,523
Int. Cl.[4] A61F 5/04
U.S. Cl. 128—87 R **9 Claims**



1. A quick-release maxillo-mandibular splint appliance for jaw stabilization, comprising:

(a) separate upper and lower means capable of being interconnected in immovable relation with selected upper and lower teeth of the patient;

(b) tab means extending from said upper and lower means means to a permit registered and aligned assembly position to be formed between said upper and lower means to define a set of interleaved tab means along the jaw of the patient;

(c) removable and releasable lock means for engaging said interleaved tab means to form an interlocked relation, between said separate upper and lower means, said lock means being easily removable to enable patient jaw movement;

(d) wherein said separate upper and lower means each comprises:

(1) an anchor member at least partially encircling a selected tooth of the patient,

(2) a connector plate supported by said anchor member, and

(3) retainer means received by said anchor member and securing said connector plate in immovable assembly with said selected tooth, and

(4) wherein said connector plate defines an elongate planar member having a pair of spaced tab means formed into eyelets with aligned openings through said tab means;

(e) wherein said lock means comprises an elongate wire threadable through said eyelets;

(f) wherein said connector plate tab means comprise a pair of tabs spaced apart to enable interengaging relation with similar tabs on a mating connector plate; and

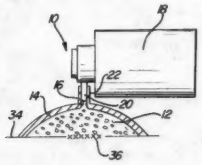
(g) wherein said releasable lock means releasably engages said interengaged tabs to establish releasable interlocking relation between said interengaging opposed tabs.

4,872,450

WOUND DRESSING AND METHOD OF FORMING SAME

Eric D. Austad, 309 Riverview Dr., Ann Arbor Township, Washington County, Mich. 48105

Continuation-in-part of Ser. No. 641,813, Aug. 17, 1984, abandoned. This application Jul. 26, 1985, Ser. No. 759,628
Int. Cl.[4] A61F 5/04
U.S. Cl. 128—90 **2 Claims**



1. A dressing for a skin wound of the type having blood and drainage associated therewith, said dressing being of a size slightly larger than said wound and having a surface substantially covering said wound and engaging a continuous area of the skin around the wound and generally in the plane of the skin around the wound, to thereby form an enclosure for the wound, said enclosure having an opening in said surface forming a conduit through which foam can be injected so as to directly engage the wound, and a layer of medical grade foam directed through said conduit into engagement with said skin and contained thereagainst by said surface of said dressing in a covering relation with said wound at a position disposed between said wound and said enclosure, whereby the foam not only provides a protective cushion for the wound but also a volume for absorbing blood and drainage from the wound, and a medium into which antibiotics can be introduced.

4,872,451

GLENOHUMERAL LIGAMENT REPAIR

Robert R. Moore, 1897 National Ave., Hayward, Calif. 94545; Steve Lamb, 6724 Corte Del Vista, Pleasanton, Calif. 94566, and Eugene M. Wolf, 3400 California St., 2nd Floor, San Francisco, Calif. 94118

Filed Feb. 2, 1987, Ser. No. 9,667
Int. Cl.[4] A61F 5/04
U.S. Cl. 128—92 YF **7 Claims**

1. A ligament repair kit for installing a ligament fastener comprising:

a drill cannula having a slender tubular barrel with a distal end having an opening;

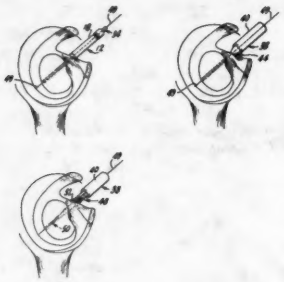
at least one slender obturator having a pointed end sized and constructed to removably insert into the barrel of the drill cannula with the pointed end projecting through the opening at the distal end of the barrel, the drill cannula and inserted pointed obturator being constructed and

adapted to spear ligamentous structures and advance them to an anchoring site;

a cannulated drill bit having a central bore hole sized to fit over a conventional k-wire, the drill bit being sized to fit within the drill cannula and project through the distal end opening when the slender obturator is removed, the drill bit being connectable to a bone drill for drilling a bone hole while the drill cannula retains ligamentous structures over the anchoring site;

a drive cannula having a tubular barrel with a distal end having an opening;

a cannulated obturator constructed to removably insert in the tubular barrel of the drive cannula the cannulated



obturator having a pointed tip and a narrow central bore hole sized to fit over a conventional k-wire installed through the cannulated drill bit to retain ligamentous structures at the anchoring site when the drill bit is removed; and

a cannulated fastener driver having a shank with a bore hole sized to fit over a conventional k-wire, the shank having a driver tip with means for engaging a cannulated bone fastener wherein the shank and tip of the driver and the fastener are sized to fit within the barrel of the drive cannula over a conventional k-wire when the cannulated obturator is removed for installing the fastener into a hole drilled into an anchoring bone for retaining ligamentous structures at the anchoring site by the fastener.

4,872,452

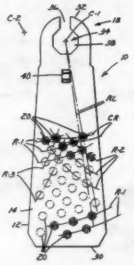
BONE RASP

Charles E. Alexson, Amery, Wis., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jan. 9, 1989, Ser. No. 295,254

Int. Cl.[4] A61F *5/04*

U.S. Cl. 128—92 VJ **17 Claims**



1. A rasp adapted for rasping generally hard tissue, such as bone, cartilage and associated tissue, the rasp comprising a generally plate-like body having opposite generally parallel major surface portions, an attaching means having a center for detachably attaching the rasp to a powered device for driving the rasp, and a plurality of rasp portions arranged along the rasp for substantially evenly rasping hard tissue, each rasp portion having a center, and a plurality of slots through the body extending generally radially outwardly from the center of the portion to define a plurality of cantilever cutting members extending generally radially inwardly of the rasp portion generally toward the center of the rasp portion and separated from one another by the slots, the cutting members being bent to project outwardly from the major surface portions of the body with alternating members of each rasp portion being bent to project outwardly from opposite surface portions of the body.

11. A method of manufacturing a rasp adapted for rasping generally hard tissue, such as bone, cartilage and associated tissue, the method comprising the following steps:

providing a hardened stainless steel plate having opposite generally parallel major surfaces;

forming an attaching means having a center on the plate for detachably attaching the rasp to a powered device for driving the rasp; and

forming a plurality of rasp portions arranged along the rasp for substantially evenly rasping hard tissue, including the steps of forming each rasp portion by:

laser cutting a plurality of slots through the body to extend generally radially outwardly from a center to a perimeter to define a plurality of cantilever cutting members extending radially inwardly of the rasp portion; and

bending the cutting members to project outwardly from the major surfaces of the body with alternating members of the rasp portion being bent outwardly from alternating respective major surfaces of the body.

4,872,453

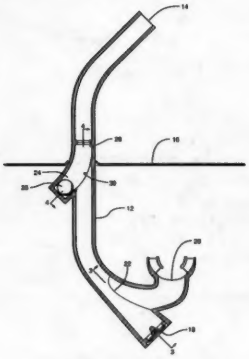
SNORKEL

Tony Christianson, 277 Grulla Ct., Norco, Calif. 91760

Filed Dec. 30, 1988, Ser. No. 292,224

Int. Cl.[4] B63C *11/16*

U.S. Cl. 128—201.11 **17 Claims**



1. A snorkel device comprising:

a conduit having first and second ends thereof;

said first end of said conduit being open whereby it is unobstructed and freely admits ambient fluid into said conduit;

mouthpiece means joined to said second end of said conduit and communicating fluid flow with said conduit;

a chamber intersecting said conduit intermediate said first and second ends of said conduit, said chamber intersection communicating fluid flow with said conduit;

a mobile member situated in said chamber, said mobile mem-

ber substantially blocking outward fluid flow in said conduit when water is flooding said chamber; and

purge valve means disposed below said chamber, said purge valve means arranged to selectively provide unidirectional flow from said conduit to ambient.

4,872,454

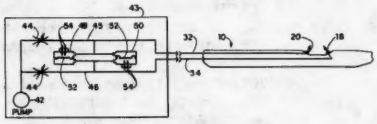
FLUID CONTROL ELECTROSURGICAL DEVICE

Egidio L. DeOliveira, Fairport, and John R. Scoville, Henrietta, both of N.Y., assignors to Lucas DeOliveira, Fairport, N.Y.

Continuation-in-part of Ser. No. 47,502, May 7, 1987, abandoned, which is a continuation of Ser. No. 787,685, Oct. 15, 1985, abandoned. This application Feb. 7, 1989, Ser. No. 307,050

Int. Cl.[4] A16B *17/36*

U.S. Cl. 128—303.14 10 Claims



1. A control device for use with an electrosurgical generator having two different electrical output modes comprising:

(a) a handpiece having at least two exhaust ports;

(b) a pressure source for providing a continuous flow of a fluid to each of said at least two exhaust ports;

(c) a transmission tube having at least two passageways for connecting said pressure source to each of said at least two exhaust ports of said handpiece;

(d) a fluid pressure responsive switch means connected by said passageways to said exhaust ports and a pressure source for activating one of said output modes in response to the blockage of at least one of said exhaust ports; and

(e) a blade at one end of said handpiece, said blade being electrically connected to the output of said electrosurgical generator.

4,872,455

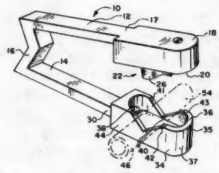
ANASTOMOSIS TRIMMING DEVICE AND METHOD OF USING THE SAME

Leonard Pinchuk, and Martin, Jr. John B., both of Miami, Fla., assignors to Corvita Corporation, Miama, Fla.

Continuation of Ser. No. 125,810, Nov. 25, 1987, abandoned, which is a continuation of Ser. No. 869,299, Jun. 2, 1986, abandoned. This application Dec. 30, 1988, Ser. No. 292,643

Int. Cl.[4] A61B *17/32*

U.S. Cl. 128—305 25 Claims



1. A reuseable/disposable device for trimming an end section of a tubular structure, such as a vascular graft or a blood vessel which is to be sutured to another tubular structure, to provide the trimmed end with a smooth, reproducible shape, the end being trimmed in such a manner as to mate with the second tubular structure, to form an end-to-end anastomosis, or to mate with an incision on the side of a structure to form an end-to-side anastomosis, said device comprising first and second element mounting structures coupled to each other in a manner allowing at least one of said structures to move relative to the other structure and each having an elongate axis and an opposing surface; said opposing surface of said first element mounting structure including means for mounting a replaceable cutting element parallel to said elongate axis thereof; said cutting element including a blade carrier and a single-edged, cutting blade of predetermined length mounted approximately centrally of said carrier; said cutting blade having a curvilinear shape along the length thereof and said cutting blade extending a predetermined distance outwardly from said carrier, which distance is equal along the length of the blade, and facing toward said opposing surface of said second element mounting structure; said opposing surface of said second element mounting structure including means for mounting a replaceable mating element parallel to said elongate axis thereof; said mating element having a cutting board-like surface which faces said cutting element and which, upon movement of one of said first and second element mounting structures toward the other structure, bears against said blade of said cutting element along the length of said blade; said mounting structure for said mating element including alignment means adapted to receive an end section of a tubular structure therein, said tubular structure adapted to extend across said mating element and be maintained in alignment relative to said cutting element by said alignment means to provide means by which an end section of said tubular structure can be reproducibly trimmed.

4,872,456

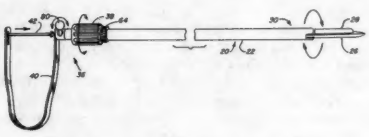
TEMPLATE INCISION DEVICE

Harrith M. Hasson, P.O. Box 14898, Chicago, Ill. 60614

Filed Nov. 12, 1987, Ser. No. 119,488

Int. Cl.[4] A61B *17/28*

U.S. Cl. 128—321 21 Claims



1. A device for use in laser surgery, comprising:

a first jaw having serrations on one surface;

a second jaw pivotable to engage a facing surface with the first jaw one surface, said second jaw facing surface having opposite serrations for clamping tissue between said jaws, and said second jaw having a slot therethrough open to said first jaw to provide a guide for laser cutting; and

means for pivoting said first and second jaws together for clamping,

said first jaw having a solid surface to block passage of a laser beam directed through said slot in the second jaw with the first and second jaws together for clamping to thereby prevent damage to tissue behind said first jaw.

4,872,457

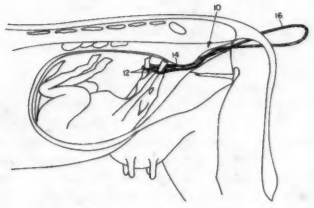
APPARATUS FOR ASSISTED PARTURITION OF LIVESTOCK AND METHOD OF MAKING SAME

Howard D. Thompson, Rte. 4, Box 186, Brenham, Tex. 77833

Filed Apr. 21, 1988, Ser. No. 184,138

Int. Cl.[4] A61B *17/42*

U.S. Cl. 128—352 11 Claims



1. An apparatus for assisted delivery of livestock comprising

rope having a first segment, a second segment, a third segment, and a fourth segment:

said first segment being hollow woven and having a first axially oriented, central channel with a first aperture and a second aperture, said second aperture being displaced longitudinally on said rope from said first aperture;

said second segment being hollow woven and having a second axially oriented, central channel with a third aperture and a fourth aperture, said fourth aperture being displaced longitudinally on said from said third aperture, said second segment being displaced longitudinally on said rope from said first segment by said third segment which extends between said first segment at said second aperture and said second segment at said third aperture;

said fourth segment extending as a continuation of said first segment, forming a first loop and turning to enter said first channel at said first aperture, extending through said first channel, exiting said first channel at said second aperture, spanning between said first segment and said second segment, entering said second channel at said third aperture, extending through said second channel, exiting said second channel at said fourth aperture, extending past said fourth aperture forming a second loop and merging with the remainder of said rope as an extension of said second segment;

said first segment acting as a first adjustment arrester for arresting movement of said fourth segment inside said first channel when a traction force is applied to said first segment so said first loop is adjustable in size so long as no traction force is applied to said first segment, and is substantially fixed in size when a traction force is applied to said first segment;

said second segment acting as a second adjustment arrester for arresting movement of said fourth segment inside said second channel when a traction force is applied to said second segment so said second loop is adjustable in size so long as no traction force is applied to said second segment, and is substantially fixed in size when a traction force is applied to said second segment;

said first and second loops for placement about a livestock fetus' forelimbs for applying a traction force to said fetus, said loops when adjustable facilitating ease of engagement with said fetus and when fixed for safely applying said traction force without danger of crushing said forelimbs.

4,872,458

THERMOTHERAPY APPARATUS

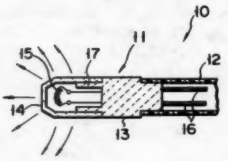
Katsuyaki Kanehira; Syuichi Takayama; Atsushi Amano; Hiroki Hibino; Naoki Uchiyama, and Akio Nakada, all of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Sep. 8, 1987, Ser. No. 94,377

Claims priority, application Japan, Sep. 16, 1986, 61-217517; Sep. 16, 1986, 61-217518

Int. Cl.[4] A61F 7/12

U.S. Cl. 128—401 **20 Claims**



1. A thermotherapy apparatus which is inserted in a body cavity through a medical tool in order to perform thermotherapy of a diseased part of a tumor in a living body, comprising;

a probe sized for insertion in a body cavity through an endoscope, said probe having a distal end portion adapted to project into the body cavity through an endoscope;

a heating portion provided in said distal end portion, and having a far-infrared radiation ceramic member and a heater for heating said far-infrared radiation ceramic member;

wherein said probe has an elongated guide tube adapted to be inserted in an endoscope, and a mounting member, one end of which is fixed to a body cavity side of said guide tube, said far-infrared radiation ceramic member of said heating portion being mounted on the other end of said mounting member;

wherein said far-infrared radiation ceramic member is formed to have a cap-like shape having a closed end portion at the side of a body cavity, said heater being arranged therein.

4,872,459

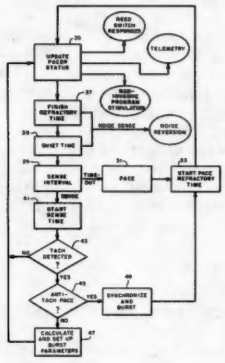
PACEMAKER FOR DETECTING AND TERMINATING A TACHYCARDIA

Benjamin D. Pless, Palo Alto, and Michael B. Sweeney, Mountain View, both of Calif., assignors to Intermedics, Inc., Angleton, Tex.

Division of Ser. No. 765,047, Aug. 12, 1985, abandoned. This application May 27, 1988, Ser. No. 199,998

Int. Cl.[4] A61N 1/36

U.S. Cl. 128—419 PG **10 Claims**



1. A method for detecting a pace-terminable tachycardia condition, comprising the steps of:

a. detecting consecutive electrical cardiac events which each define a time interval with respect to an immediately preceding event;

b. detecting at least three consecutive high rate cardiac events and associated time intervals which are each less than a predefined tachycardia time interval;

c. defining an average rate stability interval as the average of the longest and the shortest of the time intervals of said at least three consecutive high rate events;

d. counting each detected consecutive rate stable event which has an associated interval which is less than said tachycardia interval and which does not vary by more than a predefined amount of interval change from said defined average rate stability interval;

e. setting the count to zero and returning to step b. if an event is detected with an interval greater than the tachycardia time interval;

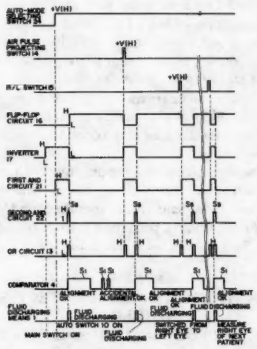
f. setting the count to zero, defining a new average rate stability interval based upon the most recently detected three events and associated intervals and returning to step d. if an event is detected with an interval that varies by more than said predefined amount of interval change from the then defined average rate stability interval, and

g. detecting a pace-terminable tachycardia condition when a predefined number of rate stable events is counted.

4,872,460
NONCONTACT TYPE TONOMETER

Kouji Nishio, and Yoshihiko Hanamura, both of Tokyo, Japan, assignors to Tokyo Kogaku Kikai Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 19, 1987, Ser. No. 87,039
Claims priority, application Japan, Aug. 21, 1986, 61-195832; Aug. 21, 1986, 61-195833
Int. Cl.[4] A61B *3/16*
U.S. Cl. 128—648 **7 Claims**



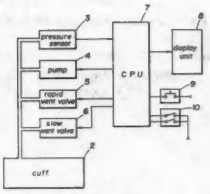
1. A noncontact type tonometer comprising:
fluid discharging means for discharging a fluid towards the cornea of an eye to be tested along an axis thereof;
alignment detecting means for detecting an alignment between the axis of said fluid discharging means and the vertex of said cornea, and for outputting an alignment signal when the alignment occurs;
alignment completion determining means for determining whether or not the alignment had been completed upon receipt of the alignment signal from said alignment detecting means and outputting an alignment completion signal when the alignment has been completed; and
controlling means for outputting an action command signal for automatically performing the fluid discharge of said fluid discharging means based on the alignment completion signal, said controlling means being provided with a delaying means for delaying an outputting time point of an action command signal for a next following fluid discharge with respect to an outputting time point of the action command signal for a preceding fluid discharge, so that the next following fluid discharge will be prohibited for a predetermined time from the preceding fluid discharge.

4,872,461
ELECTRONIC BLOOD PRESSURE METER HAVING IMPROVED CUFF REPRESSURIZATION MEANS

Yoshinori Miyawaki, Yawata, Japan, assignor to Omron Tateisi Electronics Co. and Isao KAI, both of Kyoto, Japan

Filed May 31, 1988, Ser. No. 200,551
Claims priority, application Japan, Oct. 15, 1987, 62-260329
Int. Cl.[4] A61B *5/02*
U.S. Cl. 128—681 **16 Claims**

1. An electronic blood pressure meter, comprising:
a cuff which can be pressurized into applying pressure to a part of a human patient;
pressurization means for pressurizing the cuff, wherein said pressurization means initially pressurizes the cuff to an initial cuff pressure which may or may not be above the systolic pressure of said patient;
depressurization means for depressurizing the cuff;
pressure sensing means for detecting a pressure of the cuff while said depressurization means is depressurizing said cuff and for providing an output thereof;
blood vessel information detecting means for detecting blood vessel information of the part of the human patient and for providing an output thereof;
detecting means for detecting, based on said blood vessel information, whether the initial cuff pressure was below the systolic pressure of the patient;
predicting mean, responsive to detection of a sub-systolic initial cuff pressure, for computing a predicted systolic pressure value from the outputs of the pressure sensing means and from the blood vessel information detecting means;

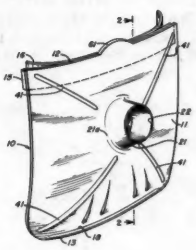


repressurization level determining means for determining a repressurization level based on the predicted systolic pressure value computed by said predicting means if said detecting means detects a sub-systolic initial cuff pressure;
repressurization means for instructing said pressurization means to pressurize said cuff to said repressurization level if said detecting means detects a sub-systolic initial cuff pressure; and
blood pressure value determining means for determining systolic and diastolic pressure values according to said outputs from the blood vessel information detecting means and the pressure sensing means.

4,872,462
PROPHYLACTIC APRON

Gilbert Salz, 22702 Via Rodrigo, Mission Viejo, Calif. 92692, and Mark Sullivan, 24953 Paseo de Valencia, #8C, Laguna Hills, Calif. 92653

Filed May 18, 1988, Ser. No. 195,258
Int. Cl.[4] A01G *5/42*
U.S. Cl. 128—842 **2 Claims**



1. A flexible shield conformed for attachment to the person of a male user, comprising:
a resilient, thin, pliable membrane of substantially rectangular planform defined by an upper edge, and lateral edges extending therebetween;
an adhesive strip formed on the surface of said membrane in adjacent proximity with said upper edge;
a peelable cover releasably adhered to said strip;

a frustoconical, tubular segment extending from said membrane proximate the center thereof defined by a peripheral wall of axially decreasing thickness towards the end opening thereof;

a sectionally enlarged edge bead formed in said membrane at the lower edge thereof; and

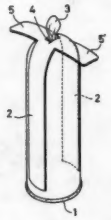
a plurality of elongate sectionally enlarged ribs formed in said membrane and aligned radially from said tubular segment toward said edges of said membrane, whereby said ribs and said edge bead cooperate to expand said membrane.

4,872,463

CONDOM APPLICATOR

Taiji Nishizono, Kuki, Japan, assignor to K.K. Chibakou Shoji, Chiba, Japan

Filed Jul. 13, 1987, Ser. No. 72,332
Claims priority, application Japan, Sep. 12, 1986, 61-141212
Int. Cl.[4] A61F 5/44
U.S. Cl. 128—844 **3 Claims**



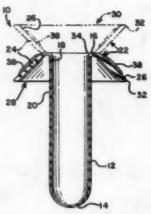
3. A condom applicator for use with a condom having a hem ring at one end, a sheath, and a pocket at the end remote from the hem ring, the condom applicator comprising a single and continuous strip for being placed on opposing sides of the sheath and to be rolled therewith, the strip in use extending over the pocket and including a slot through which the pocket is adapted to pass, and be held in a substantially airtight manner, and at least one pull tab attached to the strip along the length thereof near the slot, wherein pulling upon the tab causes the condom to unroll.

4,872,464

PUBIC PROPHYLACTIC WITH SNAP-OVER SHIELD

Marvin P. Loeb, Huntington Beach, Calif., and John F. Perry, Vernon Hills, Ill., assignors to Xtramedics, Inc., Deerfield, Ill.

Filed Aug. 4, 1987, Ser. No. 81,360
Int. Cl.[4] A61F 5/44
U.S. Cl. 128—844 **14 Claims**



1. An improved condom having a two-position public pubic area shield comprising:

an elastic, elongated tubular penis enclosing member having a longitudinal axis, an inner surface, an outer surface, an open proximal end, and a closed distal end;

a generally frusto-conically configured, self-supporting, resilient pubic area shield member having opposed first and second side surfaces and a central aperture defined therein whose diameter approximates the diameter of said proximal end, and having a peripheral rim in radially and diagonally outwardly spaced relationship to said aperture;

annular flexible joining means interconnecting said proximal end with said shield member circumferentially about said aperture whereby said first surface is generally coextensive with said outer surface, and said second surface is generally coextensive with said inner surface;

said shield member being longitudinally invertable about said annular joining means from a first stable configuration to a second stable configuration;

said first configuration corresponding to a storage configuration wherein said tubular member, when longitudinally collapsed, is generally nestably receivable with said shield means;

said second configuration corresponding to a use configuration wherein said tubular member, when extended, projects away from said shield member; and

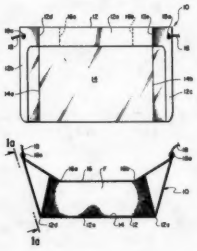
said second surface being provided with a bioadhesive.

4,872,465

LIGHT-WEIGHT DISPOSABLE PROTECTIVE FACE SHIELD

David H. Kuntz, 11810 Bel Ter., Los Angeles, Calif. 90049, and Louis F. Muller, 919 Main St., El Segundo, Calif. 90245

Continuation-in-part of Ser. No. 138,070, Dec. 28, 1987, Pat. No. 4,825,878. This application Dec. 9, 1988, Ser. No. 281,743
Int. Cl.[4] A61F 9/04
U.S. Cl. 128—857 **10 Claims**



1. A light-weight, disposable face shield assembly for the protection of the eyes and face of a wearer from accidental exposure to infectious, hazardous or undesirable substances, said face shield assembly comprising:

(a) an elongated, generally rectangular, semi-flexible, transparent face protection panel including a central panel section and like side panel sections foldable rearwardly along vertical fold lines with respect to the central panel section;

(b) an elongated, semi-flexible head support strip for said face protection panel in alignment with the upper portion of said panel and having a length that is less than the length of said face protection panel, said head support strip including a central strip portion and like side strip portions foldable rearwardly along vertical fold lines with respect to the central strip portion with the fold lines of said head support strip lying within the fold lines of said face protection panel;

(c) means for attaching the ends of said head support strip to the ends of said face protection panel in its upper portion whereby said panel is supported in spaced orientation from said head support strip; and

(d) means attached to said head support strip at the ends

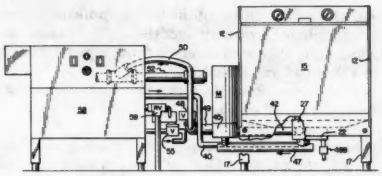
thereof for maintaining said strip in position about the forehead of a wearer of said face shield assembly whereby said face protection panel is formed up into rigidly-supported arcuate spaced protection orientation about the face of a wearer.

4,872,466

LOW ENERGY, LOW WATER CONSUMPTION WAREWASHER

Tore H. Noren, Petaluma, Calif., assignor to Hobart Corporation, Troy, Ohio

Division of Ser. No. 833,946, Feb. 26, 1986, Pat. No. 4,810,306.
This application Dec. 12, 1988, Ser. No. 282,664
Int. Cl.[4] A47L *15/16*
U.S. Cl. 134—57 D 9 Claims



1. In a warewasher for use in commercial establishments using a single batch of water for washing and rinsing a rack of ware and operating on a cycle time in the order of three minutes or less,

a wash chamber,

a door for opening and closing said chamber for introduction of a rack of soiled ware into the chamber and removal therefrom upon completion of washing and rinsing,

a sump at the bottom of the chamber for holding water for use as a supply in washing the ware,

at least one wash arm within said chamber and having a plurality of wash nozzles,

recirculating pump means having an inlet connected to said sump and an outlet connected to said wash arm whereby during operation of said pump means said wash arm provides pressurized spraying of recirculated wash water from said sump onto the ware on the rack,

a supply of fresh water under pressure located outside said chamber,

rinse nozzles in said chamber located to spray rinse water over a rack of ware and being in fluid communication with said fresh water supply,

valve means intermediate said water supply and said rinse nozzles for enabling rinsing of washed ware in response of opening of said valve means,

drain means for draining a first portion of the wash water from said sump upon completion of washing a rack of ware,

means for retaining a second portion of said wash water for use as wash water for a second rack of ware, and

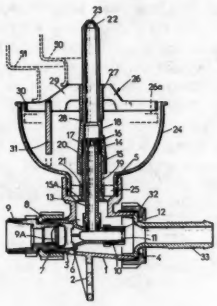
control means for operating said recirculating pump means to recirculate wash water onto the ware for washing the ware and then operating said drain means to remove the first portion of wash water from the sump and to retain the second portion, thereafter opening the valve means to rinse ware with fresh water through said rinse nozzles, and then closing said valve means upon rinsing the ware to complete the cycle for a given rack of ware and to add the fresh rinse water to the retained portion of the wash water.

4,872,467

DEVICE FOR RINSING CONTAINERS

Patrick Ballu, Reims, France, assignor to Tecnoma, Epernay, France

Filed Nov. 18, 1988, Ser. No. 272,927
Claims priority, application France, Nov. 30, 1987, 87 16561
Int. Cl.[4] B08B *3/02, 9/08*
U.S. Cl. 134—104.2 8 Claims



1. A device for rinsing containers in which a onepiece assembly comprising:

inlet means for a pressurized rinsing liquid,

a channel connected to said inlet means and provided with a nozzle located at the end of a conduit capable of penetrating in said container via an orifice of said container and capable of spraying rinsing liquid towards the inner walls of the container,

a funnel capable of collecting the polluted liquid escaping from the container via said orifice, and

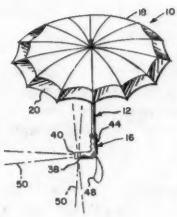
a polluted liquid ejector fed via a branch from the rinsing liquid supply, having an inlet connected to said funnel and an outlet for the polluted liquid mixed with the fraction of rinsing liquid which supplies said ejector.

4,872,468

SAFETY UMBRELLA

Ronald S. Cole, 209 Bache Ave., Staten Island, N.Y. 10306

Filed Oct. 14, 1988, Ser. No. 258,004
Int. Cl.[4] F21V *33/00*
U.S. Cl. 135—16 2 Claims



1. A safety umbrella which comprises a pole, a flashlight handle secured to said pole, for providing better visibilitiy to passing motorists, and a canopy secured to said pole having a glowing and reflective strip, for adding visibility to said passing motorists, said flashlight handle being formed in one piece of plastic material in an L-shaped configuration having a base portion extending horizontally from a vertical, gripping portion with the umbrella opened in an upright, protective condition, a bore extending into the base portion from the free end thereof and a battery, a bulb, a reflector and a coil spring

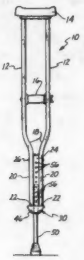
received in said bore, a threaded lens cap threadedly received on the free end of said base portion, a transparent lens fixedly secured to said lens cap closing the bore, with the lens and reflector having their optical axes extending along the handle base portion so as to direct light from the bulb through the free end of the bore in a horizontal direction, an on-off switch being mounted at an upper end of said gripping portion of said handle and circuit means extending between said on-off switch, said battery and said bulb, the vertical, gripping portion of the handle being formed with a bore extending axially inwardly from an uppermost end thereof providing a socket receiving said pole whereby said handle is secured to said pole, said flashlight handle further comprises lighting means that includes an optical fiber having one end fixedly secured in an opening provided through said reflector, and another end of said optical fiber engages with an upwardly domed lens fixedly secured to a top of the gripping portion of said flashlight handle of said umbrella.

4,872,469

CRUTCH WITH STAIR DEFLECTOR

Jim Schultz, Simi Valley, Calif., assignor to Guardian Products, Inc., Calif.

Filed Nov. 22, 1985, Ser. No. 800,697
Int. Cl.[4] A61H *3/02*
U.S. Cl. 135—69 **6 Claims**



1. In a crutch of the type including two bow members having upper ends attached to an arm support and parallel lower ends, a footpiece mounting tube affixed lower end, a footpiece telescopically slidable within said mounting tube for adjusting the overall length of the crutch, and a manually releasable fastener means for locking the footpiece to said mounting tube at a first location upwardly removed from said open lower end against said sliding movement, the improvement comprising:

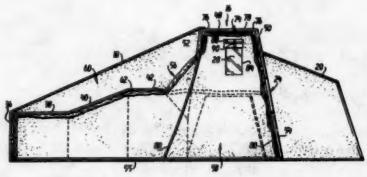
a unitary end cap having three sockets defined in its upper side for receiving and interconnecting the lower ends of said mounting tube and said bow members, the lower end of one of said sockets defining a bushing at the lower end of said mounting tube, said bushing closely fitting the cross-section of said footpiece and cooperating with said fastener means to support the footpiece at a second location axially spaced from said first location thereby to prevent wobbling of the footpiece within said mounting tube, the bottom of said end cap defining stair deflecting lower edges comprising surfaces tapering inwardly from the lower ends of the bow members to said bushing.

4,872,470

PORTABLE EMERGENCY SHELTER

John P. Hayashida, and Roger P. Bowman, both of Waterloo, Canada, assignors to Her Majesty the Queen in right of Canada, Canada

Filed Mar. 11, 1988, Ser. No. 166,899
Int. Cl.[4] E04H *15/36*
U.S. Cl. 135—97 **14 Claims**



1. An emergency shelter of the type comprising a thermally insulating shell and a canopy over the shell, wherein the thermally insulating shell is of elongate form, tapered from a head end to a foot end and includes:

a foot section adjacent the foot end, dimensioned to accommodate the feet of a user;

a head section adjacent the head end, with a height greater than that of the foot section and dimensioned to accommodate the head and torso of a user in an upright orientation;

a knee section between the head and foot sections adjacent the foot section, with a height between those of the foot and head sections and dimensioned to accommodate the flexed, upright legs of a user;

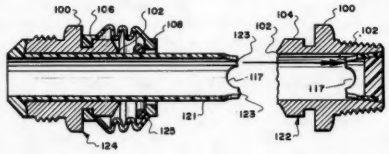
a transition section joining the head and knee sections and a canopy of flaccid material enclosing and spaced from the foot, knee and transition sections of the thermally insulating shell to define a heat transfer chamber between those sections and the canopy.

4,872,471

SEPARABLE AND BREAKAWAY VALVE INTERCONNECTING A FLUID LINE

Peter J. Schneider, 2480 Calle Narciso, Thousand Oaks, Calif. 91360

Filed Sep. 21, 1988, Ser. No. 247,205
Int. Cl.[4] F16L *29/00*
U.S. Cl. 137—68.1 **24 Claims**



1. A separable valve interconnecting a fluid line to another fluid line or tank for holding fluids comprising:

a generally cylindrically shaped coupler having a stationary section and a breakaway section axially aligned with each other;

said breakaway section and said stationary section defined by a frangible groove circumferentially positioned between said breakaway and stationary sections of said coupler;

a generally axially positioned bore extending through said coupler and having a first and second opening at opposite ends of said coupler;

a plastic seal tube having a first end and a second end and having a length in excess of the length of said axial bore of said coupler and slideably positioned in said bore;

said plastic seal tube having a hollow tube means for allowing fluid passage;

said plastic seal tube having a sealing means toward said first end;

said plastic seal tube having a cap means inserted at said first end, said cap means and said sealing means forming a plug means for sealing off said bore of said coupler in the event of separation of said breakaway and said stationary sections of said coupler;

said hollow tube of said plastic seal tube having at least one flow through port means towards said first end for allowing fluid to pass through;

said plastic seal tube having stop means at its said second end for maintaining said hollow tube in said axial bore, and for maintaining said first end of said tube and said flow through port extending from said first opening of said axial bore when said valve is in its normal operating position;

said frangible groove positioned between said sections of said coupler will fracture upon sufficient force applied to the separable valve causing said sections of said coupler to pull apart;

said stop means at said second end of said plastic seal tube moving with said separating breakaway section of said coupler thereby pulling said first end of said seal tube into said axial bore at said first opening and sealing off said bore by preventing fluid escape through said bore;

the continued pulling away of said stop means of said plastic seal tube and said breakaway section of said coupling resulting in strain on said hollow tube resulting in separation of said hollow tube from said first end near said flow through port thereby allowing complete separation of said breakaway and said stationary sections of said coupler.

4,872,472

FLUID PRESSURE REGULATING VALVE

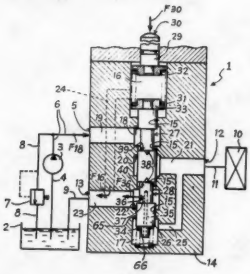
Jean-Claude A. Lefevre, Coye-la-Foret, and Antoine T. Mauboussin, Montfermeil, both of France, assignors to Case Poclain, Le Plessis Belleville, France

Filed Jul. 10, 1981, Ser. No. 282,131

Claims priority, application France, Jul. 21, 1980, 80 16040; Jun. 2, 1981, 80 10921

Int. Cl.[4] G05B *9/00*

U.S. Cl. 137—116.3 **2 Claims**



1. A fluid pressure regulating valve comprising:

(a) a valve body comprising an admission chamber for receiving fluid of a first pressure level from a source of pressurized fluid, a discharge chamber for discharging the fluid having a second pressure level to a regulated pressurized fluid using device, said second pressure level being less than said first pressure level, a fluid return chamber for receiving the fluid of a third pressure level and for returning the fluid to a non-pressurized reservoir, said third pressure level being not greater than said second pressure level, a cavity, and a bore in communication with each of said admission chamber, said return chamber and said cavity;

(b) a regulating slide valve movably mounted within said bore to one of the following three positions:

(1) a first position in which said slide valve establishes a first fluid path through said bore between said discharge chamber and said admission chamber, and isolates said discharge chamber from said return chamber, said slide valve and said bore defining in said first position an adjustable space therebetween as said slide valve is moved,

(2) a second position in which said slide valve establishes a second fluid path through said bore between said discharge chamber and said return chamber, said slide valve and said bore defining in said second position an adjustable space therebetween as said slide valve is moved, and

(3) an intermediate position in which said slide valve substantially isolates said discharge chamber from said admission chamber except for a leaking flow from said admission chamber towards said discharge chamber;

(c) an actuatable member for disposing said slide valve towards its first position;

(d) spring means being disposed between said actuatable member and said slide valve;

(e) first means for defining a first communication conduit between said discharge chamber and said cavity, whereby the fluid pressure within said cavity tends to displace said slide valve in a direction from its intermediate position towards its second position; and

(f) second means for defining a second communication conduit, in said intermediate position of said slide valve, between said cavity and said return chamber, said second communication means comprises means for forming a calibrated restriction having dimensions selected so that the flow rate of the fluid flow passing through said second communication conduit is not greater than the flow rate of said leaking flow, said second defining means unblocks, in said intermediate position of said slide value, said second communication conduit and blocks said second communication conduit in said first position of said slide valve.

4,872,473

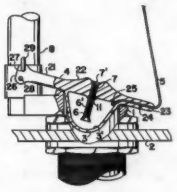
DUAL FLOAT VALVE CONTROL FOR REGULAR AND DOUGLAS TYPE VALVE

Michael Agostino, 101-A Spring St., St. Augustine, Fla. 32084

Filed Mar. 30, 1988, Ser. No. 175,308

Int. Cl.[4] E03D *1/34, 1/35*

U.S. Cl. 137—270 **19 Claims**



1. A unitary and reversible buoyant and non-buoyant flush tank valve adapted for use in various types of flush tanks each having a different selective valve operating means for moving said valve, a water inlet, an inlet valve, a water outlet with a valve seat thereat selectively closable by said valve and an upstanding overflow pipe adjacent the water outlet, said valve comprising an elongated base with opposite end portions, said base having at one of its said end portions first attachment means for selectively connecting the valve operating means

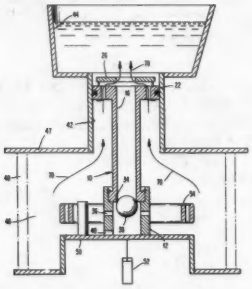
thereto for moving said valve to a first position in which said valve is open and a second position in which said valve is closed on the valve seat, said base having at another of said end portions first mounting means for selectively attaching said valve onto the upstanding overflow pipe for movement between said first and second positions, said elongated base having opposite generally planar sides and a generally vertical extending hollow frusto-conical cup member on one of said sides defining an interior surface, said base and said cup member being reversible between a buoyant and non-buoyant position, said cup member being selectively disposed downwardly when said flush valve is mounted in the buoyant position and located within the water outlet when said flush valve is in said second position, said cup member being selectively disposed upwardly when said flush valve is mounted in the non-buoyant position, said base having second attachment means for selectively connecting the valve operating means thereto, said second attachment means including first and second oppositely disposed bores having interior, threads, said bores being affixed to said base, said first bore being adapted to be selectively engaged by a substantially vertical rod having exterior threads at the lower end portion thereof for disposing said cup member downwardly, or said second bore for disposing said cup member upwardly, said second attachment means being selectively connected to the valve operating means via the substantially vertical rod for movement in the vertical direction to move said valve between said first and second positions, wherein only one of said mounting means being selective depending on which different valve operating means is to be utilized with said flush valve in the various types of flush tanks.

4,872,474

DIVERTER VALVE

Philip N. Middleton, Chantilly, Va.; Glen R. Green, Boise, Id., and Harry Girlock, Mountaintop, Pa., assignors to Ore-Ida Vended Products, Inc., Boise, Id.

Filed Oct. 14, 1988, Ser. No. 257,924
Int. Cl.[4] F16K *17/18*
U.S. Cl. 137—493.8 **9 Claims**



1. A diverter valve for controlling fluid flow through a generally cylindrical passage between an expansible chamber and a second chamber comprising:

a valve body having a first end connected to the expansible chamber and a second end disposed in the generally cylindrical passage, defining a generally longitudinal fluid channel, having a radial enlargement in the fluid channel at the first end, and having at least one lateral opening through the valve body between the radial enlargement and the first end;

a valve flange attached to the second end of the valve body, having an outside diameter sized to provide a running fit with the generally cylindrical passage, and having a plurality of axially-extending openings therethrough;

an annular valve ring mounted to the valve body, axially movable relative to the valve flange, and having a position where the valve ring covers the axially-extending openings of the valve flange; and

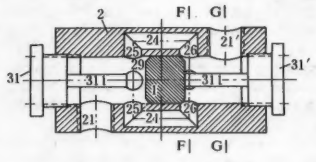
a valve ball in the fluid channel between the radial enlargement and the first end, having a position engaging the radial enlargement which blocks fluid communication between the radial enlargement and the lateral opening.

4,872,475

ADJUSTABLE DIFFERENTIAL FLOW SHUTTLE VALVE

Zeng Xiang-Wei, 11 4th Block South Renmin Road, Chengdu, Sichuan Province, China

Filed Apr. 22, 1988, Ser. No. 184,741
Claims priority, application China, Apr. 28, 1987, 87103004-2
Int. Cl.[4] F16K *15/02, 17/26*
U.S. Cl. 137—493 **11 Claims**



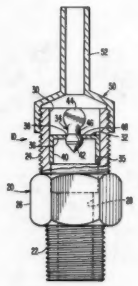
1. Adjustable differential flow shuttle valve comprising a shell having fluid openings for connection with pipe-lines, and a shuttle chamber connected with the fluid openings, and a plunger slidably enclosed in the shuttle chamber, wherein only two fluid openings are provided respectively at the two ends of the shell and connected with the two ends of the shuttle chamber, at least one by-pass connects the two ends of the shuttle chamber around the shuttle chamber for entire fluid flow through said valve, and two throttling control elements are placed at the two juntions of the by-pass and the shuttle chamber controlling the stroke of the plunger.

4,872,476

CHECK VALVE FOR ENGINE COOLING SYSTEM

Robert P. Pflum, Indianapolis, Ind., assignor to Caltherm Corporation, Columbus, Ind.

Filed May 24, 1988, Ser. No. 197,955
Int. Cl.[4] F16K *15/06*
U.S. Cl. 137—513.5 **11 Claims**



1. A check valve for use in a cooling system for an engine, comprising:

a valve body having a first port and a second port;

a venting plug positioned in one of said ports, said venting plug having an opening permitting fluid communication

between said first and second ports and a valve seat surrounding said opening;

a valve element for closing said opening in response to fluid pressure on said valve element, said valve element including a head having a sealing surface for engaging said valve seat, an anchor positioned on an opposite side of said venting plug from said head, and a neck extending through said opening and connecting said head to said anchor, said anchor extending across said opening to prevent separation of said valve element from said venting plug; and

a bleed port extending through said venting plug,

wherein said venting plug is secured in its port in a press fit.

4,872,477

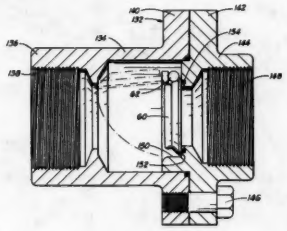
SWING CHECK VALVE

John P. Scaramucci, 10724 Woodridden, Oklahoma City, Okla. 73170

Division of Ser. No. 49,383, May 13, 1987, Pat. No. 4,809,738, which is a continuation-in-part of Ser. No. 23,786, Mar. 9, 1987, abandoned. This application Sep. 27, 1988, Ser. No. 249,942

Int. Cl.[4] F16K *15/03*

U.S. Cl. 137—515.5 **3 Claims**



1. A swing check valve, comprising:

a tubular valve body internally threaded at one end;

a substantially round valve disc in the valve body having a seating face and having a hinge pin thereon extending parallel with the seating face thereof; and

a tubular fitting secured to the opposite end of the valve body having one end portion thereof extending into the valve body and the opposite end portion thereof internally threaded; said one end portion forming a cage surrounding a portion of the disc when the disc is in a closed position and a valve seat adjacent the cage sized to receive the seating face of the disc; and the opposite end portions of said cage being grooved to form bearing areas to support the opposite end portions of said hinge pin, whereby the disc may swing in the valve body between open and closed positions.

4,872,478

SWING CHECK VALVE

John P. Scaramucci, 10724 Woodridden, Oklahoma City, Okla. 73170

Division of Ser. No. 49,383, May 13, 1987, Pat. No. 4,809,738, which is a continuation-in-part of Ser. No. 23,786, Mar. 9, 1987, abandoned. This application Sep. 27, 1988, Ser. No. 249,707

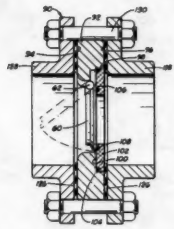
Int. Cl.[4] F16K *15/03*

U.S. Cl. 137—515.7 **7 Claims**

1. A swing check valve, comprising:

a tubular valve body having an annular shoulder formed therein facing one end of the valve body, said shoulder having a pair of hinge pin recesses therein facing in the same direction as the shoulder;

a substantially round disc in the body having a seating face thereon and a hinge pin thereon extending parallel with the seating face thereof, the opposite end portions of the hinge pin journalled in said hinge pin recesses to pivotally support the disc in the valve body; and



a replaceable valve seat in the valve body abutting said shoulder and overlapping said hinge pin recesses, said valve seat having a seating face sized to mate with the seating face of the disc.

4,872,479

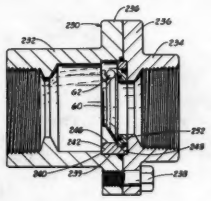
SWING CHECK VALVE

John P. Scaramucci, 10724 Woodridden, Oklahoma City, Okla. 73170

Division of Ser. No. 49,383, May 13, 1987, Pat. No. 4,809,738, which is a continuation-in-part of Ser. No. 23,786, Mar. 9, 1987, abandoned. This application Sep. 27, 1988, Ser. No. 249,868

Int. Cl.[4] F16K *15/03*

U.S. Cl. 137—515.7 **1 Claim**



1. A swing check valve, comprising:

a tubular valve body;

a first ring in the valve body forming a valve seat having an annular seating face thereon;

an elastomeric sealing ring in the seating face of the valve seat;

a substantially round valve disc in the valve body having a seating face sized to engage the seating face of the seat and having a hinge pin thereon extending parallel with the seating face thereof; and

a second ring in the valve body having a counter bore in one end thereof receiving the first ring and having a portion thereof forming a cage abutting the first ring and surrounding a portion of a disc when the disc is closed, the opposite end portions of said cage being grooved to form hinge pin bearing areas supporting the opposite end portions of the hinge pin thereon; each of said grooves having a width extending at a right angle to the seating face of the valve seat greater than the diameter of the hinge pin, whereby the disc can float a limited distance toward and away from the valve seat.

4,872,480

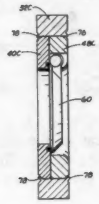
SWING CHECK VALVE

John P. Scaramucci, 10724 Woodridden, Oklahoma City, Okla. 73170

Division of Ser. No. 49,383, May 13, 1987, Pat. No. 4,809,738, which is a continuation-in-part of Ser. No. 23,786, Mar. 9, 1987, abandoned. This application Sep. 27, 1988, Ser. No. 249,998

Int. Cl.[4] F16K *15/03*

U.S. Cl. 137—527.8 5 Claims



1. A swing check valve, comprising:

a tubular valve body having first and second ends;

a first ring in the valve body having one end thereof substantially coterminous with the first end of the body and the second end thereof forming a valve seat having a seating face extending normal to the axis of the valve body;

a substantially round valve disc in the valve body having a seating face sized to engage the seating face of the seat and having a hanger pin thereon extending parallel with the seating face thereof; and

a second ring in the valve body abutting the first ring and forming a cage surrounding the disc when the seating face of the disc engages the seating face of the valve seat; the end face of said second ring facing the valve seat having a pair of grooves therein receiving the opposite end portion of the hinge pin for pivotally supporting the valve disc in the valve body, and the opposite end face of said second ring being substantially coterminous with the second end of the valve body.

4,872,481

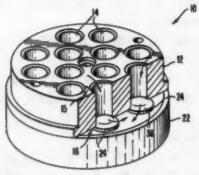
POPPET VALVE FLOW SEAT

Richard E. Shaw, Inman, and Steven R. Wolverton, Simpsonville, both of S.C., assignors to Cooper Industries, Inc., Houston, Tex.

Continuation of Ser. No. 710,715, Mar. 12, 1985, abandoned. This application Jun. 12, 1986, Ser. No. 873,862

Int. Cl.[4] F16K *15/00*

U.S. Cl. 137—543.17 12 Claims



1. In a poppet valve seat assembly including a seat member having a surface with at least one port, the port having an exit forming an edge with the adjacent portion of the surface, the seat assembly for use with a poppet movable into, and out of, engagement with the seat member for sealing, and unsealing, the port exit, respectively, the improvement comprising:

(i) a chamfer formed at the edge of the port exit; and

(ii) a counter-bore formed in the port exit edge immediately upstream of said chamfer with respect to the flow direction through the port.

4,872,482

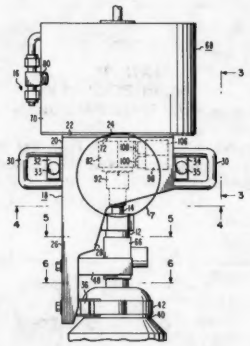
REMOTELY CONTROLLED OPERATOR FOR GAS CYLINDER VALVE

Jawrence P. Jarrett, Wind Gap, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Jun. 24, 1988, Ser. No. 211,487

Int. Cl.[4] F16K *27/08*

U.S. Cl. 137—554 20 Claims



1. An operator for the valve of a gas cylinder adapted to be mounted on the cylinder and to be remotely activated for rotating the valve stem of the valve between an open and closed position comprising:

a frame adapted to be mounted on the gas cylinder:

means for clamping the frame to a non-cylindrical portion of the valve;

pneumatic activating means having a housing mounted on the frame, a rotary shaft projecting from the housing in alignment with the valve stem when the frame is mounted on the cylinder and pneumatic means in said housing for selectively rotating said shaft in either direction;

means connected to the end of the shaft and adapted to receive the end of the valve stem; and

means for remotely operating the pneumatic means to selectively rotate the shaft in either direction.

4,872,483

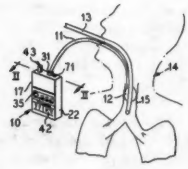
CONVENIENTLY HAND HELD SELF-CONTAINED ELECTRONIC MANOMETER AND PRESSURE MODULATING DEVICE

Nyan S. Shah, Mentor, Ohio, assignor to International Medical Products, Inc., Mentor, Ohio

Filed Dec. 31, 1987, Ser. No. 140,121

Int. Cl.[4] A61M *16/04*

U.S. Cl. 137—557 7 Claims



1. An electronic manometer assembly for use in monitoring pressure at a site in the body of a patient comprising:

a numerical read-out unit having a size adapted to be conveniently held in the palm of the hand of a user, said numerical read-out unit having an output passage therein;

manually digitally operable pump means contained in said numerical read-out unit in fluid communication with said output passage for generating a pressure head;

delivery means in fluid communication with said output passage and adapted for insertion in a patient for delivering said pressure head from said output passage to said site in said patient said delivery means terminating in an enclosed, inflatable cuff;

electronic pressure transducer means in said numerical read-out unit in fluid communication with said output passage for generating an electrical signal corresponding to the pressure in said cuff of said delivery means;

electronic display means in said numerical read-out unit electrically connected to said transducer means for visually displaying a number corresponding to said electrical signal and thus to said pressure in said cuff of said delivery means; and

power supply means contained within said numerical read-out unit and electronically connected to said electronic pressure transducer means and to said electronic display means for supplying electrical power thereto.

4,872,484

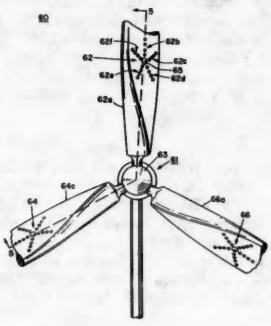
SYSTEM FOR CONTROLLING THE FLOW OF A FLUID MEDIUM RELATIVE TO AN OBJECT

John Hickey, Apt. 4A, 27 Bowdoin St., Boston, Mass. 02114

Filed Dec. 12, 1988, Ser. No. 283,507

Int. Cl.[4] F15B *1/00*

U.S. Cl. 137—561 R **25 Claims**



1. A system for controlling the flow of air relative to an object comprising:

an object having at least one surface in contact with the air flow;

a plurality of deviations on each said surface and arranged in predetermined pattern, said pattern including at least one deviation set; and

said pattern covering only a portion of said at least one surface and having a common central deviation with radially extending deviation sets.

4,872,485

SENSOR OPERATED WATER FLOW CONTROL

Martin J. Laverty, Jr., Earlysville, Va., assignor to Coyne & Delany Co., Charlottesville, Va.

Filed Dec. 23, 1987, Ser. No. 137,065

Int. Cl.[4] F16K *31/02*

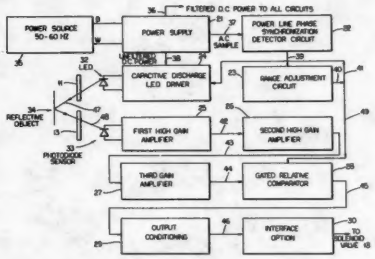
U.S. Cl. 137—624.11 **14 Claims**

1. A system for controlling the flow of water through water supply means, including:

a sensor operatively associated with said water supply means to cause water to be supplied by said water supply means;

a first control circuit coupled with said sensor for sensing and determining the continued external activation characteristic of the presence of a user or external activation proximate to said sensor and within the range of energization of said sensor and the absence of the characteristic of external activation or presence of a user;

a second control circuit including water flow time commencement means responsive to said characteristic for determining the time of commencement of the flow of



water through said water supply means in response to an external activation of said sensor after the elapse of a predetermined period of time; and

a third control circuit responsive to said second control circuit including water flow shut-off means for permitting water to flow solely for a predetermined period of time after commencement of water flow by said second control circuit, said third control circuit causing the water flow to be shut off after a predetermined period of time of water flow and overriding said second control circuit to prevent said second control circuit from commencing water flow.

4,872,486

ACCUMULATOR HAVING INCLINED COMMUNICATION HOLES

Nobuyuki Sugimura, and Kazuo Sugimura, both of 308, Mabase, Shimizu-shi, Shizuoka-ken, Japan

Filed Mar. 28, 1988, Ser. No. 174,361

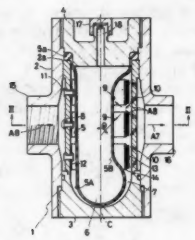
Claims priority, application Japan, Apr. 7, 1987, 62-052551; Sep. 16, 1987, 62-141450

Int. Cl.[4] F16L *55/04*

U.S. Cl. 138—30 **10 Claims**

1. An accumulator having a vessel main body provided with a feed/discharge port or ports, a bladder for partitioning the interior of said vessel into a gas chamber and a liquid chamber, said bladder including a plurality of longitudinal thin wall portions directed in an axial direction for inducing deformation of the bladder into a regular star shape, an inner tube coaxial with the vessel main body and the bladder having communication holes disposed between said feed/discharge port or ports and said bladder, and a plurality of arcuate spring plates for opening and closing said communication holes disposed on the

inside of said inner tube; characterized in that said communication holes are inclined with respect to an axis of said vessel



main body so that streams of liquid passing through said communication holes may collide obliquely against said plates.

4,872,487

PROJECTILE-CATCHING BRAKE FOR A LOOM

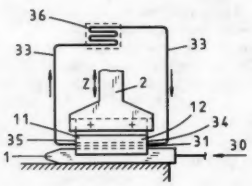
Peter Riesen, Elgg, Switzerland, assignor to Sulzer Brother Limited, Winterthur, Switzerland

Filed Feb. 18, 1988, Ser. No. 157,382

Claims priority, application Switzerland, Mar. 5, 1987, 00826/87

Int. Cl.[4] D03D *49/54*

U.S. Cl. 139—185 **15 Claims**



1. In combination,

a projectile-catching brake having a pair of brake shoes defining braking surfaces for catching a projectile therebetween; and

cooling means for directing a continuous flow of coolant at least into the vicinity of said braking surfaces.

4,872,488

DEVICE FOR DETERMINING THE POSITION OF A WARP THREAD BREAK

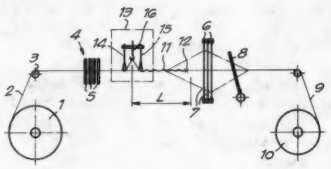
Dirk Gryson, Dikkebus-Ieper, and Henry Shaw, Vleteren, both of Belgium, assignors to Picanol N.V., Ieper, Belgium

Filed Aug. 30, 1988, Ser. No. 238,124

Claims priority, application Belgium, Sep. 2, 1987, 8700983

Int. Cl.[4] D03D *51/30*

U.S. Cl. 139—353 **14 Claims**



1. A measuring and detecting device for determining the position of a break in a warp thread on a weaving machine, comprising:

flexible thread guides disposed a predetermined distance from each other generally in line with the warp thread;

means including a hook for gripping a broken warp thread and drawing said broken thread between the thread guides, said gripping means and guides being arranged such that said broken thread contacts and flexes at least one of the guides as it is brought between them;

means for measuring flexure of said at least one thread guide when the broken warp thread is drawn between the guides and for generating measurement data based on flexure of the thread guides;

means for processing said measurement data to produce information indicative of the position of said break.

4,872,489

PROCESS OF PROVIDING IN A LIQUID-CONTAINING LIQUID FRICTION COUPLING AN AIR-FILLED SPACE HAVING A PREDETERMINED VOLUME

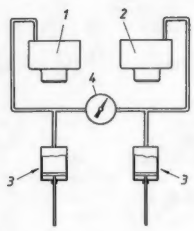
Erich Erhart, Graz St. Peter, Austria, assignor to Steyr-Daimler-Puch AG, Vienna, Austria

Filed Apr. 28, 1988, Ser. No. 187,487

Claims priority, application Austria, Apr. 29, 1987, 1070/87

Int. Cl.[4] B67C *3/00*; G01F *17/00*

U.S. Cl. 141—5 **1 Claim**



1. A process of providing in a liquid-containing liquid friction coupling an air-filled space having a predetermined volume, comprising the steps of

providing an air-tight reference vessel containing an air-filled space having said predetermined volume,

forcing equal quantities of air into said reference vessel and into said liquid-containing liquid friction coupling,

comparing the pressures in said reference vessel and in said

liquid friction coupling by means of a differential pressure indicator connected between said reference vessel and said liquid friction coupling, and

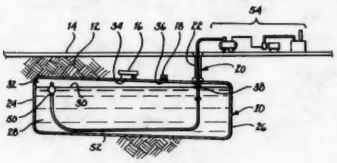
adding or removing liquid in said liquid friction coupling if there is a difference between said pressures until said differential pressure indicator shows that said difference is reduced to zero.

4,872,490

GAS EVACUATION APPARATUS FOR UNDERGROUND LIQUID STORAGE TANKS AND METHOD

Penrod C. Geisinger, Dewey, Ariz., assignor to Vaporless Manufacturing, Inc., Prescott Valley, Ariz.

Filed Jun. 16, 1988, Ser. No. 207,395
Int. Cl.[4] B65B *31/04*
U.S. Cl. 141—7 **27 Claims**



1. A method for evacuating vapor pockets in liquid filled storage tanks, said method comprising the steps of:

a. introducing a wand into the tank, which wand includes a trailing hose;

b. propelling the wand to a vapor pocket, said step of propelling including the step of discharging a fluid from the wand to create a propulsion force;

c. drawing the gaseous content of the vapor pocket through the wand and the trailing hose; and

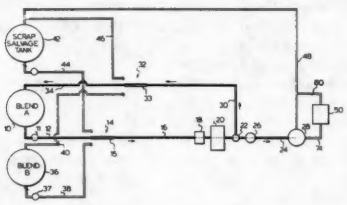
d. withdrawing the wand and the hose from the tank on completion of said step of drawing.

4,872,491

RECOVERY OF PROPELLANT FROM AEROSOL CAN FILLING OPERATION

Barry E. Nickason, Scarborough, and Orazio DiGirolamo, Weston, both of Canada, assignors to CCL Industries Inc., Willowdale, Canada

Filed May 3, 1988, Ser. No. 189,946
Int. Cl.[4] B65B *3/04, 31/00*
U.S. Cl. 141—20 **4 Claims**



1. A system for charging aerosol spray cans with propellant, comprising:

a first supply tank for housing a first blend of propellant,

a second supply tank for housing a second blend of propellant,

a scrap salvage tank for receiving propellant,

a multiple head aerosol can propellant charging device,

a propellant supply manifold,

a propellant feed line connected between said propellant supply manifold and said multiple head aerosol can propellant charging device,

said supply manifold being selectively connected to one of said supply tanks, whereby liquid propellant may be fed from a selected one of said supply tanks through said supply manifold and said propellant feed line to said charging device.

pump means in said propellant feed line for pumping liquid propellant from said selected one of said supply tanks to said charging device,

a return manifold,

a first propellant return line connected between said propellant feed line and said return manifold,

said return manifold selectively connecting said first propellant return line to a selected one of said supply tanks or to said scrap salvage tank, whereby liquid propellant in said propellant feed line not passing to said charging device is recycled by said first propellant feed or to said scrap salvage tank, and

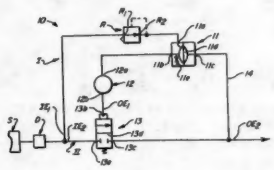
a second propellant return line connected between said charging device and said scrap salvage tank for discharging propellant from said charging device to said scrap salvage tank.

4,872,492

PNEUMATIC TIRE INFLATOR

Marcus E. McAnally, Nashville, and Robert E. Gwaltney, Brentwood, both of Tenn., assignors to Hennessy Industries, Inc., LaVergne, Tenn.

Filed Apr. 11, 1988, Ser. No. 180,086
Int. Cl.[4] B65B *31/04*
U.S. Cl. 141—38 **4 Claims**



1. A pneumatic tire inflator requiring only a source of pressurized air and a device for controlling the air flow from the source, the air pressure of the source being greater than the desired air pressure of the inflated tire; said inflator comprising first and second air flow circuits, each having an inlet end for communicating with a discharge side of the device and an outlet end, the outlet end of said second flow circuit being adapted to communicate with an inlet valve on the pneumatic tire; the first circuit includes a manually adjustable regulator means having an inlet communicating with the first circuit inlet end and an outlet, said regulator means being preset whereby the air pressure at the outlet thereof substantially corresponds to the desired tire air pressure, a pressure sensitive first valve means biased to normally assume an open position and provided with a first inlet communicating with the outlet of said regulator means, an outlet adapted to normally communicate with said first inlet, a second inlet segregated from said first inlet and said outlet, and pressure responsive means for effecting interruption of the communication between said first inlet and said outlet when there is a predetermined pressure at said second inlet overcoming the opening bias, and air accumulator means communicating with the outlet of said first valve means and being charged with air flowing from the outlet of said first valve means, said accumulator means having an outlet communicating with the first circuit outlet end; said second circuit including a pressure sensitive second valve means biased to normally assume a close position and provide with a first inlet communicating with the second circuit inlet end, a second inlet communicating with the first circuit outlet end, an outlet com-

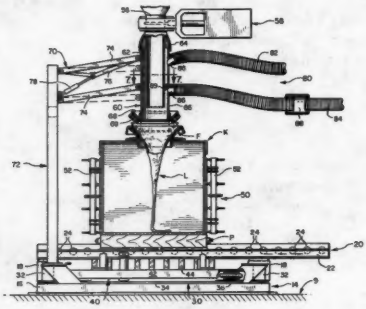
municating with the second circuit outlet end, and a pressure responsive means for effecting opening of said second valve means and communication between the first inlet and outlet thereof when the air pressure at the second inlet overcomes the closing bias, and the second inlet of said first valve means and the outlet end of said second circuit being in continuous communication with one another whereby the pressure responsive means of said first valve means is responsive directly to air pressure within the inflated pneumatic tire.

4,872,493

APPARATUS FOR FILLING A LINED CONTAINER

Wayne F. Everman, Cedar Falls, Iowa, assignor to Container Corporation of America, Clayton, Mo.

Filed May 10, 1988, Ser. No. 192,411
Int. Cl.[4] B65B *31/06*
U.S. Cl. 141—59 **1 Claim**



1. In an apparatus for transferring particulate material from a material containing hopper having a discharge conduit extending downwardly therefrom toward a rigid bulk container having a top wall with a filling opening extending therethrough to fill a flexible liner bag disposed within in the container and having an open upper end extending upwardly through a filling funnel removably and loosely positioned in said opening, said apparatus further comprising:

(a) a filling spout assembly including a pair of generally cylindrical, concentric, inner and outer spout members defining a passageway therebetween;

(b) said inner spout member having an upper end fixedly secured to a lower end of said hopper discharge;

(c) said outer spout member also having an upper end connected to the lower end of the hopper conduit by a tubular, filexible, bellows member that allows axial movement of said outer spout member relative to said inner spout member;

(d) said outer spout member having at a lower end thereof a filling flange adapted for sealing engagement with said liner bag within said filling funnel;

(e) moving means attached to said outer spout member and being operable to move said outer spout member axially, relative to said inner spout member, toward and away from said container betweeen filling and non-filling positions;

(f) air transfer means for effecting the flow of air into said container liner bag and out of said container liner bag through said passageway, as the liner bag is being filled, to:

(i) inflage the liner bag and force it against inner surfaces of the container;

(ii) force air in the container between the outer surface of the liner bag and the inner surfaces of the container out of the container through the container hatch hole outwardly adjacent said filling funnel;

(iii) compact material entering the liner bag;

(iv) exhaust dust from the liner bag;

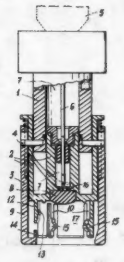
(g) said transfer means including a pair of flexible air intake and air exhaust ducts connected to said outer spout member and a baffle positioned in said passageway between said ducts for deflecting incoming air from said said exhaust duct.

4,872,494

APPARATUS WITH SAFETY LOCKING MEMBERS, FOR CONNECTING A SYTRINGE TO A BOTTLE CONTAINING A MEDICAMENT

Mario Coccia, Cesano Boscone, Italy, assignor to Farmitalia Carlo Erba S.r.l., Milan, Italy

Filed Oct. 12, 1988, Ser. No. 256,575
Claims priority, application Italy, Oct. 14, 1987, 22283 A/87
Int. Cl.[4] B65B *3/04*; A61H *5/00*
U.S. Cl. 141—383 **8 Claims**



1. Apparatus for connecting a syringe to a bottle having a lip surrounding a mouth, said apparatus comprising:

(a) a radially inner hollow part having a first end containing a first seat for a syringe and a second end;

(b) an intermediate hollow part slidably received in said radially inner hollow part and having a first open end and a second open end;

(c) a radially outer part slidably received on said intermediate hollow part and having a first end and a second end;

(d) a perforable plug received in said second open end of said intermediate hollow part;

(e) a plurality of flexible retention elements projecting axially from said second open end of said interemdiate hollow part radially outwardly of said perforable plug;

(f) at least one flexible appendix projecting axially from said second open end of said intermediate hollow part radially outwardly of said perforable plug;

(g) at least one stop tooth projecting axially from said second open end of said radially outer part towards said at least one flexible appendix; and

(h) means for limiting the axial movement of said parts relative to each other so as to define a first position, in which the overall length of said apparatus is at a maximum, and a second position, in which the overall length of said apparatus is at a minimum,

wherein

(i) said radially inner hollow part and said first open end of said intermediate part together define a chamber which, in the first position of said apparatus, has an axial length such that, in use, it entirely contains a needle in fluid communication with a syringe received in said first seat and which, in the second position of said apparatus, has an axial length such that, in use, the same needle projects through said perforable plug;

(j) said plurality of flexible retention elements and said second open end of said intermediate hollow part together

define a second seat sized, shaped, and positioned to receive and to grip the lip of a bottle; and

(k) said at least one flexible appendix is sized, shaped, and positioned so that:

(i) it is cammed radially outwardly when the lip of a bottle is received in said second seat, permitting said apparatus to assume its second position, and

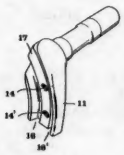
(ii) when it is not cammed radially outwardly, it abuts against said at least one stop tooth at a point during the axial movement of said parts relative to each other that prevent said apparatus from assuming its second position.

4,872,495

TOOL FOR ROTATION RING TYPE BARKING MACHINES

Lennart Magnusson, Iggesund, Sweden, assignor to Mecanis AB, Hudiksvall, Sweden

Filed Oct. 27, 1988, Ser. No. 263,524
Claims priority, application Sweden, Jun. 8, 1988, 8802141
Int. Cl.[4] B27L *1/00*
U.S. Cl. 144—208 E **8 Claims**



1. A tool for a rotation ring type barking machine, comprising

a curved arm having a free end adapted to mount a cutting edge; and

detachable mounting means at the other end of said curved arm for mounting said arm to a holder;

said detachable mounting means comprising a first pair of cooperating means associated with said curved arm and a second pair of cooperating means associated with said holder;

one of said pairs of cooperating means comprising a pair of elongated grooves spaced apart by an intermediate ridge, the other of said pair of cooperating means comprising a pair of elongated beads spaced apart by an intermediate recess with said beads being adapted to engage in said grooves;

said grooves each having converging side surfaces inclined upwardly and outwardly from a base of the groove;

said beads each having converging side surfaces inclined outwardly from a base of said bead;

the convergence of said side surfaces of said grooves forms an angle which is slightly less than an angle formed by the convergence of said side surfaces of said beads; and

fastening means for releasably fastening said arm to said holder;

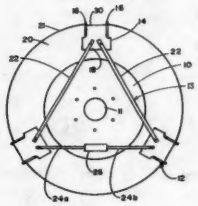
whereby tightening of said fastening means forces said beads into said grooves to thereby reduce the difference between said angles to a 0 angle upon said tightening.

4,872,496

READILY INSTALLED TIRE CLEATS WITH IMPROVED FASTENING MEANS

Benjamin A. Fortner, 402 Budleigh Salterton Close, Longwood, Fla. 32779

Continuation-in-part of Ser. No. 860,065, May 6, 1985, abandoned, which is a continuation-in-part of Ser. No. 739,921, May 31, 1985, abandoned. This application Jun. 17, 1987, Ser. No. 63,578
Int. Cl.[4] B60C *27/20*
U.S. Cl. 152—228 **39 Claims**



1. An anti-skid device for ready application to the tire of a driven vehicle wheel in order to improve its traction, said device being entirely installable from the outer or hub side of the wheel, with access to the backside of the tire or the underside of the vehicle being unnecessary, either during installation or removal, said device comprising a rigid framework adapted to be placed parallel to the plane of the tire and located against the outer sidewall of the tire, said framework being constituted by a plurality of rigid components having outer portions located radially inwardly of the tread portion of the tire, at least three curved cleats each having an inner surface, an outer road contacting surfaces, and a bent integral attachment flange, with the integral attachment flanges of said cleats being attached at approximately evenly spaced locations around the periphery of said framework, with the inner surface of each of said cleats being designed to a curve in a cantilever manner around the tread of the tire, the relationship of each integral attachment flange to the inner surface of the respective cleat being such that the each inner surface normally bends toward the axis of rotation of the vehicle wheel and has less than a 90° angle with respect to the plane of said framework, the bend in said integral attachment flanges being overcome at the time said device is tightly installed on the tire, thus to create a form of spring serving to overcome any trend toward the development of slack due to deformation of the portion of the tire in contact with the ground at a given cleat location.

4,872,497

PNEUMATIC RADIAL TIRE AND RIM COMBINATION FOR PASSENGER CAR

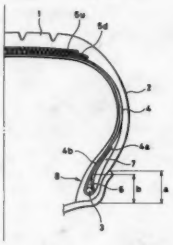
Ryoji Hanada, Hiratsuka; Tuneo Morikawa, Hadano, and Kazuyuki Kabe, Hiratsuka, all of Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 864,360, May 19, 1986, abandoned. This application Dec. 22, 1987, Ser. No. 137,214
Claims priority, application Japan, Nov. 26, 1984, 59-248142
Int. Cl.[4] B60C *15/06*
U.S. Cl. 152—541 **3 Claims**

1. A pneumatic radial tire for a passenger car and rim combination, said tire being mounted on said rim, said rim having a ring flange, said tire having a carcass layer formed of aromatic polyamide fiber cords in which an end portion is turned up around an annular bead wire and a lower bead filler from the inside to the outside of the tire to form a turnup portion which is extended along the main body of said carcass layer, wherein an upper bead filler having a JIS hardness of from 75 to 95 is disposed axially outside said turnup portion, and wherein the height b (mm) of said lower bead filler relative to the height a

(mm) of said rim flange upon which said tire is mounted satisfies the formula:

$$(a-5)<b<(a+10).$$



wherein a is measured radially outward from the diameter of the rim seat to the upper end of the rim flange and is designated as the G dimension specified by JIS-D-4218-1981.

4,872,498

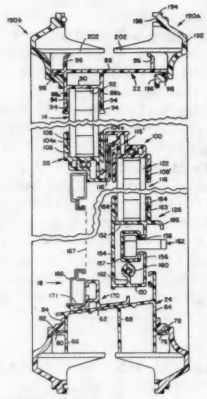
VENTING DOOR LIGHT WITH INSULATED GLASS

David A. DeBlock, and Kert E. Artwick, both of Holland, Mich., assignors to ODL, Incorporated, Zeeland, Mich.

Filed Oct. 1, 1987, Ser. No. 103,393

Int. Cl.[4] E06B *3/32*

U.S. Cl. 160—90 **12 Claims**



1. A window comprising:
a frame including a sill;
a sash slidably supported by said frame and movable between a closed position adjacent said sill and an open position away from said sill;
a screen supported by said frame and having a lower edge adjacent said sill; and
a plurality of bracket assemblies secured to said sill and spaced at discrete locations, each said bracket assembly including a first spacer spacing said sash a first distance above said sill, each said bracket assembly further including a second spacer spacing said screen a second distance above said sill, said first and second distances being sufficient to prevent capillary action from retaining water between said sill and said sash and said sill and said screen, respectively, each said bracket assembly further including registration means for registering said lower edge of said screen in a desired plane with respect to said sill.

4,872,499

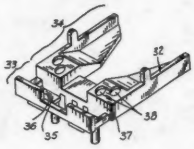
VERTICAL LOUVRE BLIND TRAVELLER BRIDLE

Richard N. Anderson, Owensboro, Ky., assignor to Hunter Douglas Inc., Upper Saddle River, N.J.

Continuation-in-part of Ser. No. 853,818, Apr. 18, 1986, Pat. No. 4,732,202. This application Feb. 11, 1988, Ser. No. 154,728

Int. Cl.[4] E06B *9/36*

U.S. Cl. 160—168.1 **11 Claims**



1. A vertical louvre blind, comprising:
a horizontal headrail;
a pull cord, extending within said headrail;
a number of travelers;
a lead traveler; and
a bridle for the lead traveller;
said travelers, said lead traveler and said bridle all sliding along said headrail, and said bridle comprising:
(a) a body having a bottom surface and means adapted to receive and retain the lead traveller;
(b) at least two openings defined by said bottom surface of said body for receiving the pull cord; and
(c) a post extending downwardly from said bottom surface for being received in a loop of said pull cord which is passed through one of said at least two openings, over said post, and through a second one of said at least two openings, so that said pull cord extends down through one of said openings, around said post, and returns upwardly through one of said openings to fictionally attach said bridle and said pull cord to prevent relative movement therebetween, whereby movement of said pull cord causes the bridle to move along said headrail.

4,872,500

METHOD OF MANUFACTURING A TOOL

Donald Duffey, 504 Edgehill Rd., New Bern, N.C. 28560; Sellers Hardee, 345 Piney Grove Rd., Pollucksville, N.C. 28573; Wayne Smith, 5304 Rossie Rd.; James Elliott, 4924 Morton Rd., both of New Bern, N.C. 28560; Robert Gardner, 401 Hamlet Rd., Summerville, S.C. 29483, and Claus Suess, Eichenstr. 27, D-7133, Maulbonn, Fed. Rep. of Germany

Filed Oct. 14, 1986, Ser. No. 919,752

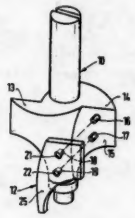
Claims priority, application Fed. Rep. of Germany, Oct. 12, 1985, 3536496

Int. Cl.[4] B22D *19/06*

U.S. Cl. 164—34 **8 Claims**

1. A method of manufacturing a composite chip-removing tool, such as a spiral drill or a milling tool, which includes a tool body of a material which is in its molten state above a predetermined melting temperature, and at least one tipping element secured to said tool body, comprising the steps of positioning the tipping element on a model of the tool body which consists of a material that melts at a temperature considerably lower than said predetermined melting temperature, in a position relative to the model which the tipping element is to assume relative to the tool body; simultaneously forming the tool body and a durable mechanical connection of the tipping

element to the tool body in a casting operation involving replacement of the material of the model with the material of the



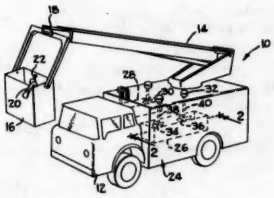
tool body in its molten state; and providing the tipping element prior to said positioning step with at least one aperture.

4,872,501

HEAT EXCHANGER FOR MOBILE AIRCRAFT DEICING MACHINE AND METHOD OF USE

Edwin C. Hightower, Orlando, Fla., assignor to FMC Corporation, Chicago, Ill.

Filed Mar. 17, 1986, Ser. No. 840,356
Int. Cl.[4] B64D *15/00*
U.S. Cl. 165—1 **7 Claims**



5. A method of heating deicing fluid in a tank on a deicer having a coil element submerged in said tank; comprising the steps of:

a. circulating a hot fluid through said coil element;

b. heating the bulk of said deicing fluid to a predetermined holding temperature by;

1. stirring the deicing fluid to cause free flow thereof past said coil element; and

2. mixing the deicing fluid flowing past said coil element with the bulk of said deicing fluid;

c. raising the temperature of said deicing fluid above said holding temperature just prior to deicing an aircraft by;

1. isolating the last portion of said deicing fluid to flow past said coil element; and

2. pumping only said isolated portion from said tank.

7. In an aircraft deicer having a tank, a spray gun for directing heated deicer fluid onto an aircraft, and a deicer fluid pump connected to supply deicer fluid under pressure to said spray gun; the improvement comprising:

a heat exchanger having a coil element through which a hot fluid may be circulated;

means mounting said heat exchanger adjacent the bottom of said tank;

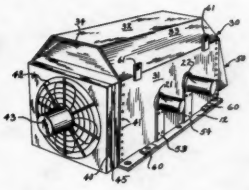
a suction line connected to said pump and arranged so that substantially all of the fluid flowing into said suction line when said pump is operated must flow past said coil element whereby last pass heating of the deicer fluid before being pumped to the spray gun is provided.

4,872,502

AIR COOLING OF ENCLOSED GEAR DRIVES

Richard W. Holzman, Waukesha, Wis., assignor to The Falk Company, Milwaukee, Wis.

Filed Sep. 25, 1987, Ser. No. 100,895
Int. Cl.[4] F01M *5/00*; F16H *57/02*
U.S. Cl. 165—39 **12 Claims**



1. An air cooling enclosure for a gear drive having a closed housing and shafts projecting from the housing, comprising:

a plurality of sides joined together to surround all exposed surfaces of the gear drive housing except for a bottom of the housing, said sides being spaced from the surfaces of the housing and having openings through which the shafts project, one of the sides having an air inlet and an opposite side having an air outlet;

a plurality of spaced baffles extending inwardly from the sides of the enclosure toward the housing; and

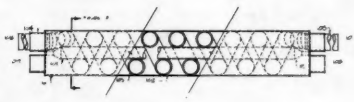
a source of air under pressure connected to the air inlet.

4,872,503

AIR HEAT EXCHANGER

Raymond E. Marriner, Box 7, Site 16, R.R. 7, Calgary, Alta., Canada (T2P 2G7)

Filed Mar. 13, 1986, Ser. No. 839,207
Int. Cl.[4] F24H *3/02*
U.S. Cl. 165—54 **4 Claims**



1. An air-to-air heat exchanger to transfer heat from air which is being exhausted from an enclosed space, to incoming fresh air comprising: a rigid, circular in cross section outer tube, a central core around which a continuous flexible inner tube is spiralled longtitudinally, inlets and outlets for each of the inner and outer tubes connected to the fresh and exhaust air flows respectively so as to effect a counter-current flow through the heat exchanger.

4,872,504

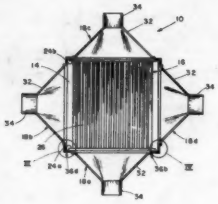
MODULAR HEAT EXCHANGER HOUSING

Fritz Huebner, Zeeland, Mich., assignor to Plascore, Inc., Zeeland, Mich.

Division of Ser. No. 800,662, Nov. 22, 1985, Pat. No. 4,735,261, which is a division of Ser. No. 417,639, Sep. 13, 1982, Pat. No. 4,588,543. This application Dec. 21, 1987, Ser. No. 135,921
Int. Cl.[4] F28F *21/06, 9/18*; F24H *3/02*
U.S. Cl. 165—54 **4 Claims**

1. A heat exchanger housing comprising four duct units grouped into first and second sets, each said set including an inlet duct unit and an outlet duct unit through which a quantity of fluid flows into and out of said heat exchanger housing, all said duct units being substantially identical to one another and

of a single piece unitary construction, each of said duct units having opposite sides, each said side being directly connected to a side of an adjacent duct unit of the other set so that said duct units collectively define a core-receiving chamber, said inlet duct unit and said outlet duct unit of each set being further arranged to define a path through which the quantity of fluid flows as it passes through said heat exchanger housing, each



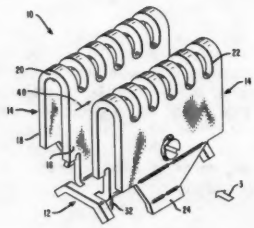
said duct unit further including a first structure defining an inner opening and a second structure defining an outer opening, said inner and outer openings cooperating to form a path through which said quantity of fluid flows as it passes through said duct unit, and said first and second structures of each duct unit defining openings which are oriented substantially parallel to each other.

4,872,505

HEAT SINK FOR AN ELECTRONIC DEVICE

Jack E. Jones, Casselberry, and David J. Bulmahn, Winter Springs, both of Fla., assignors to NCR Corporation, Dayton, Ohio

Filed Aug. 16, 1988, Ser. No. 232,821
Int. Cl.[4] H02L *23/40*
U.S. Cl. 165—80.3 **17 Claims**



1. A heat sink for conducting heat from an electronic device comprising:

a base for mounting said heat sink to a board; and

means for retaining an electronic device; said means including a U-shaped member having first and second walls connected by a top ridge, said first wall being integral with said base and extending outwardly therefrom and said second wall having a terminus portion proximate said first wall;

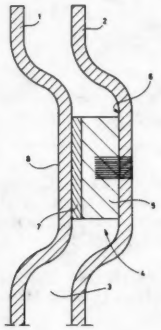
wherein an electronic device is retainable between said first wall and terminus portion for heat conduction from said device directly into said first and second walls.

4,872,506

GASKET FOR PLATE HEAT EXCHANGER

Mats Nilsson; Bernt Tagesson, and Ladislav Novak, all of Lund, Sweden, assignors to Alfa-Laval Thermal AB, Tumba, Sweden

PCT No. PCT/SE86/00497, § 371 Date Mar. 21, 1988, § 102(e) Date Mar. 21, 1988, PCT Pub. No. WO87/03673, PCT Pub. Date Jun. 18, 1987
PCT Filed Oct. 30, 1986, Ser. No. 170,999
Claims priority, application Sweden, Dec. 11, 1985, 8505849
Int. Cl.[4] F28F *3/00*; F16J *15/00*
U.S. Cl. 165—166 **9 Claims**



1. In combination with a plate heat exchanger having a plurality of heat exchange plates, there being spaces between adjacent plates in the heat exchanger defining flow passages for heat exchange media, a gasket applied between two adjacent plates characterized in that the gasket (4) comprises a strip (5) of metal, fastened to one of the plates (1, 2) and bridging at least 50% of but not the whole distance between the plates, and a layer (7) made of a material with a lesser hardness than the metal and applied onto a surface of the metal strip directed towards the other of said two plates (1, 2), said layer (7) bridging the remaining part of said distance between the plates.

4,872,507

WELL BORE APPARATUS ARRANGED FOR OPERATING IN HIGH-TEMPERATURE WELLS AS WELL AS IN LOW-TEMPERATURE WELLS

Robert L. Ronco, Sr., Destrehan, La., and Piero Wolk, Houston, Tex., assignors to Schlumberger Technology Corporation, Houston, Tex.

Filed Jul. 5, 1988, Ser. No. 215,185
Int. Cl.[4] E21B *36/00*
U.S. Cl. 166—57 **45 Claims**

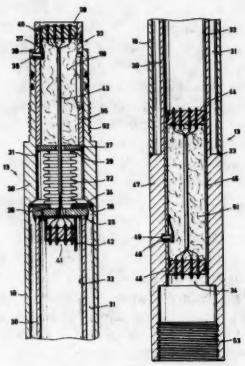
18. A set of alternative tool outer housings respectively arranged for receiving and protecting, over a wide range of subterranean temperatures including a lower range and a higher range, a single group of temperature-sensitive electrical well bore devices, said set comprising:

a first tubular housing for providing thermal protection over said higher temperature range, said first housing having a predetermined external diameter and a longitudinal bore of a predetermined internal diameter and including means for defining a hollow exterior wall having an internal evacuated annular chamber surrounding said longitudinal bore for thermally insulating its said longitudinal bore;

a second tubular housing for providing thermal protection over said lower temperature range, said second housing having a solid exterior wall with an outer diameter substantially equal to said predetermined outer diameter of said first housing and a longitudinal bore having an inner diameter that is substantially equal to said predetermined

inner diameter of said longitudinal bore in said first housing;

closure means for sealingly enclosing said longitudinal bore in each of said housings and including thermal insulation means cooperatively arranged for thermally insulating at



least one end of said longitudinal bore in said first housing; and

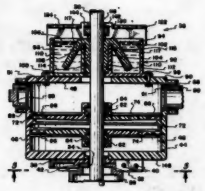
electrical connector means cooperatively arranged on said closure means for providing electrical connections to said electrical devices disposed within said longitudinal bore in either of said housings.

4,872,508

OIL WELL PUMP LEAKAGE ACCUMULATOR

Richard W. Gordon, 224 "B" St., Taft, Calif. 93268

Filed Oct. 31, 1988, Ser. No. 264,793
Int. Cl.[4] E21B *33/08*
U.S. Cl. 166—84 2 Claims



1. In combination with an oil well sump pump which has a reciprocating polish rod, said polish rod being mounted within a stuffing box, said polish rod extending exteriorly of said stuffing box, the improvement comprising:

an accumulator mountable about said polish rod, said accumulator being connected in a liquid-tight manner to said stuffing box preventing leakage of liquid from said stuffing box into the ambient, said accumulator having an internal chamber;

a liquid passage located between said polish rod and said accumulator adjacent said stuffing box, said liquid passage connecting with said internal chamber, any liquid leakage from said stuffing box along said polish rod is caused to flow through said passage into said internal chamber and collect in said internal chamber; and

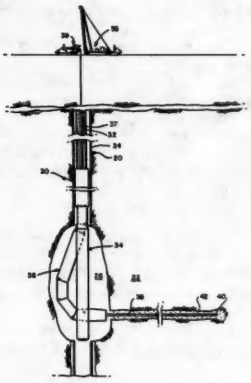
said accumulator being formed of a two part housing, said two part housing being clamped together about said polish rod, each said part of said housing including a pair of protuberances, each said protuberance of one part of said housing abutting against a said protuberance of the other part of said housing forming a pair of rails, a tongue member being slidingly engageable with each said rail thereby tightly holding together said two parts of said housing.

4,872,509

OIL WELL PRODUCTION SYSTEM USING A HOLLOW TUBE LINER

Ben W. O. Dickinson, San Francisco County; Robert W. Dickinson, Marin County; Randall R. Anderson, Solano; Eric W. Dickinson, Marin County, and Robert D. Wilkes, Alameda County, all of Calif., assignors to Petrolphysics Operators, San Francisco, Calif.

Continuation-in-part of Ser. No. 811,572, Dec. 23, 1985, Pat. No. 4,750,561. This application Feb. 12, 1988, Ser. No. 155,361
Int. Cl.[4] E21B *43/10*
U.S. Cl. 166—278 29 Claims



1. In a method of forming a production apparatus for withdrawing oil from an oil bearing underground formation through a well casing in the formation, the steps of

(a) passing a hollow radial tube through a housing in a well casing to the formation and drilling the radial tube to project into the formation, said radial tube and formation defining an annulus therebetween which is relatively permeable or free of formation,

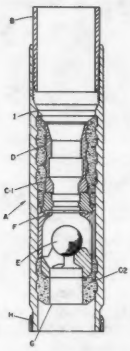
(b) passing a flexible, elongated, hollow tube liner through the casing and radial tube and out into the formation, and

(c) withdrawing the radial tube from the formation through the casing, leaving the liner in the formation, said liner including openings of a size and character to pass oil from said formation into said liner but substantially block passage of formation particles.

4,872,510
SUBTERRANEAN WELL CASING FLOAT TOOL

Douglas J. Lehr, Houston; Merle L. Bell, New Waverly; Richard P. Rubbo, The Woodlands, all of Tex., and Richard L. Forehand, Ardmore Park, Singapore, assignors to Baker Hughes Incorporated, Houston, Tex.

Filed Sep. 30, 1988, Ser. No. 252,043
Int. Cl.[4] E21B *34/08*; F16K *15/00*
U.S. Cl. 166—327 11 Claims

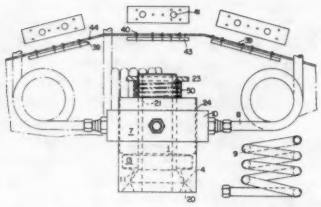


1. A subterranean well casing float tool, comprising:
(a) a tubular metal housing securable to a well casing conduit;
(b) valving means implaced within said housing, said valving means comprising:
(1) a thermosetting frame;
(2) valve head and valve seat means operatively carried relative to said frame and selectively movable relative to one another from an open position to a closed position;
(3) biasing means for relatively urging said valve head toward said valve seat means;
(4) a compartment including said valve head for enclosure around the biasing means when the valve head is moved fully away from the valve seat means; and
(c) means for directly securing said valving means to said housing.

4,872,511
FIRE EXTINGUISHING APPLIANCE AND APPENDED SUPPLEMENTARY APPLIANCES

Charles B. Davis, Hochstrasse 24, D4400 Münster, Fed. Rep. of Germany

Filed Apr. 13, 1987, Ser. No. 40,393
Claims priority, application Fed. Rep. of Germany, Jan. 26, 1987, 3711774
Int. Cl.[4] A62C *1/00, 35/00, 35/52*
U.S. Cl. 169—12 5 Claims



1. A stationary fire extinguishing appliance to extinguish fire in enclosed spaces and areas by continually controlling and injecting heated air products of combustion through an open-ended passage within said area or space, by drawing in and returning said heated air and products of combustion to the base of a fire; identified by a hollow venturi tube having a longitudinal axis and by an adjustable orifice-ring on the end of said tube which allows discharge and suction fire extinguishing flows at sonic speeds; identified by said tube (1), which is axially shiftable along said axis, with a fire extinguishing agent conveying injector opening (11) having a cross-sectional area that is adjustable by said axial shifts of said tube (1), by suction spaces for the products of combustion which conduct burnt gas mixtures to the base of a fire under application of a secondary chemical extinguishing agent in powder blocks (43), through sub-burn-out spaces (39), in a burn-out space (38) along a shield (44) into the open passage of said tube (1) which is coaxially mounted in slide-action within an annular body (4) by steel springs (50) with a threaded adjustment ring (23) which regulate and offset the cross-sectional area of the injector opening (11), which is circular-formed, with a fire extinguishing agent which is driven and conducted through pressure lines (8) and a pressure chamber (13) and which controls with pressure the cross-sectional area of the circular-formed injector opening (11) with said opening (11) shut off at a lower, outer end of the tube (1) when the tube (1) is shifted axially, said outer end having a first, outer conical surface (16) which describes a first acute angle (α), intersecting at a lower conical end of the annular body (4) which has a second inner conical surface (15) that describes a second acute angle (β), with the first acute angle (α) is greater than the second acute angle (β) and with the second conical surface (15) and the first conical surface (16) in juxtaposition and the injector opening (11) is formed and is identified by the orifice ring, a diverging circular-formed discharge orifice (20) which has conical discharge surfaces that expand, said discharge surfaces are adjoining and are integrated in the adjustment shifts of the injector opening (11), which has conical discharge surfaces (17 and 18) that form an apex-adjustable, cleavable ring opening (2) which regulates the pressure and density of a driving fire extinguishing agnet, so that a venturi driving fire extinguishing agent in contact with the products of combustion drawn through the tube (1) reacts in pressure and density to incite sonic and supersonic speeds into venturi-activating as well as into suction-intake flows, so that the products of combustion are forcefully drawn out of the burn-out spaces (38 and 39) under the shield (44) through the tube (1) and so that the heat of the fire is transmitted into the driving fire extinguishing agent, onto the fire extinguishing stream of the venturi driving fire extinguishing agent, into all the fire inhibiting streams streaming through and out of the tube (1) in order to generate additional energy to fight fire.

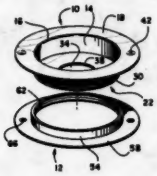
4,872,512
SUPPORT & ANCHOR ESCUTCHEON FOR SPRINKLER HEADS INSTALLED ON PIPE

Thomas L. Multer, Lilburn, Ga., assignor to Lifeprotech, Inc., Stone Mountain, Ga.

Filed May 31, 1988, Ser. No. 200,664
Int. Cl.[4] A62C *37/08*
U.S. Cl. 169—51 2 Claims

2. A sprinkler support system, comprising
a sprinkler head;
a means for delivering fluid to said sprinkler head comprising a pipe couplable to said sprinkler head;
a material to which said sprinkler head is to be anchored; and
a support and anchor escutcheon assembly, comprising:
a first cylinder containing one open end, a set of threads on its outer wall and having a radial flange extending radially outward from said open end of said cylinder and the other end of said cylinder being partially closed, wherein a hole is bored longitudinally in said partially closed end and the inner wall of said hole is threaded; and

an open ended second cylinder having a set of matable threads on the inner wall of said cylinder capable of operatively connecting with said first cylinder, said cylinder being sized to matably receive said first cylinder, and having a flange extending radially outward from one end



of said second cylinder, the other end of said second cylinder being open,

wherein when said first cylinder and said second cylinder are threaded to each other said flanges exert a sandwich pressure on a material placed between said flanges.

4,872,513

CHIMNEY FIRE EXTINGUISHER

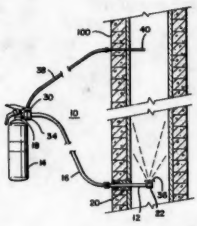
Stanley D. Gardner, Vernon, Canada, and Wilfred J. Finnigan, R.R. #Site 4, Comp. 4, Vernon, British Columbia, Canada V1T 7Z3, assignors to Wilfred J. Finnigan, Vernon, Canada

Continuation of Ser. No. 852,997, Apr. 17, 1986, abandoned, which is a continuation-in-part of Ser. No. 683,574, Dec. 19, 1984, abandoned. This application Jan. 18, 1989, Ser. No. 298,834

Claims priority, application European Pat. Off., Feb. 19, 1986, 86301178.9

Int. Cl.[4] A62C *37/12*

U.S. Cl. 169—57 **13 Claims**



1. A chimney fire extinguisher, comprising:

(a) a narrow conduit removably insertable through a small aperture in a chimney wall;

(b) a source of fire extinguishate coupled to one end of said conduit for delivery of extinguishate therethrough;

(c) a sprinkler head fixed to the opposite end of said conduit for insertion through said aperture, said sprinkler head comprising:

(i) an enclosed chamber;

(ii) a restrictor for restricting the flow of extinguishate from said conduit into said chamber;

(iii) a small orifice for spraying extinguishate from said chamber into the chimney;

(iv) fusible sealing means fused over said orifice for normally sealing said orifice; and

(d) a sleeve rigidly mountable within said aperture to receive and guide said conduit into said chimney; said sleeve including at least a first mating slot for receiving at least a first projecting lug on said conduit to releasably latch said conduit in place in in a set orientation within said sleeve.

4,872,514

DRIVE UNIT FOR DRIVING RAMMING PARTS UNDER WATER

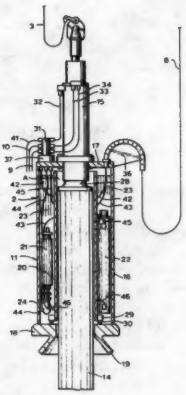
Hans Kuehn, Hamburg, Fed. Rep. of Germany, assignor to Bomag-Menck GmbH, Boppard, Fed. Rep. of Germany

Division of Ser. No. 133,901, Dec. 15, 1987. This application Nov. 14, 1988, Ser. No. 275,592

Claims priority, application European Pat. Off., Jul. 28, 1987, 871108890

Int. Cl.[4] E02D *7/10*

U.S. Cl. 173—132 **12 Claims**



1. A submergible electrohydraulic drive unit for underwater ramming devices comprising a housing having a throughgoing central receiving space for receiving at least a part of a ramming device, upper and lower supporting plates releasably mounted on the ramming device, an outer wall connecting said supporting plates with one another, and an inner wall which surrounds said receiving space; a plurality of pump units arranged between said inner wall and said outer wall at circumferential distances from one another and each including a hydraulic pump and an associated electric motor; and switching means for subdividing supply of a pressure medium produced by said hydraulic pumps to at least one of two ramming devices.

4,872,515

DRILL ROD FOR PERCUSSION DRILLING

Lars-Gunnar Lundell, Sandviken, Sweden, assignor to Sandvik AB, Sandviken, Sweden

Filed Oct. 14, 1987, Ser. No. 108,089

Claims priority, application Sweden, Oct. 15, 1986, 8604373

Int. Cl.[4] B23B *45/16*

U.S. Cl. 173—132 **5 Claims**

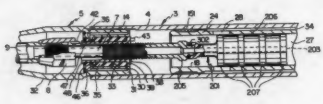
1. A force-transmitting element in percussion drill rod assemblies, comprising a cylindrical metal body including an integral thread, and a lining disposed on said thread, said lining comprising a metallic material softer than said thread, said lining being metallurgically bonded to said thread, said lining extending substantially the entirety of said thread and being of greater thickness along one of the thread flanks than along a remaining thread flank.

4,872,516

AIR DRIVEN IMPACT OPERATED GROUND PIERCING TOOL

Ronald L. MacFarlane, Buffalo Grove, Ill., and Dirk A. Wilson, Milwaukee, Wis., assignors to Oklahoma Airrow, Inc., Perry, Okla.

Continuation of Ser. No. 802,600, Nov. 27, 1985, abandoned. This application Apr. 29, 1988, Ser. No. 188,354
Int. Cl.[4] B23B *45/16*
U.S. Cl. 173—134 **9 Claims**



1. An impact-operated boring tool, comprising:
an elongated, generally cylindrical housing having a tubular inner wall;
an elongated striker lengthwise reciprocable in said housing for forward driving impacting engagement against an interior impact surface of said housing proximate the front end of said housing, said striker having a rear portion of enlarged diameter, said rear portion having an annular, outwardly opening groove therein, said striker further having a plurality of curved guiding zones proximate the front end of said striker and a flat air passage surface between, each of said guide zones have a central, outwardly opening recess therein, said striker further having a tubular wall defining a rearwardly openingly tubular recess in said striker, and a radial port disposed forwardly of said enlarged rear end portion of said striker extending through said tubular wall of said striker;
a plurality of resilient, rounded spot bearings set into said central recesses in said guide zones for sliding engagement with said tubular inner wall of said housing;
a split bearing ring fitted under compression to said tubular inner wall disposed in said annular groove in said enlarged diameter rear end portion of said striker for resilient, slidable, sealing engagement with said tubular inner wall of said housing;
a tubular inlet connectable at a rear end thereof to a pressure fluid source, said inlet having an enlarged diameter front portion closely slidably received in said tubular, rearwardly-opening recess in said striker;
passage means for reciprocating said striker in response to pressure fluid supplied through said inlet into said recess of said striker; and
a support assembly for maintaining said inlet substantially concentric to said housing.

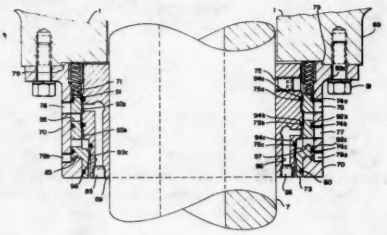
4,872,517

ROTATABLE FLUID CONDUCTOR FOR WELL APPARATUS

Daniel G. Shaw, 50 Cane River La., Conroe, Tex. 77302, and Billy MacCline, 6923 Shavelson, Houston, Tex. 77055

Filed Feb. 8, 1988, Ser. No. 153,136
Int. Cl.[4] E21B *3/00*
U.S. Cl. 173—163 **13 Claims**

1. A fluid conductor for conducting fluid under pressure to a second well apparatus, the fluid conductor connectible to a first well apparatus, the fluid to be conducted flowable through the fluid conductor, the conductor comprising
an inner gland member securable to a shaft passing therethrough,
a central gland member non-contactingly disposed about the inner gland member,
an outer gland member securable to the first well apparatus and disposed about the central and inner gland members,
the inner gland member having inner hollow channel means, extending therethrough,
the central gland member having central hollow channel means extending therethrough,
the outer gland member having outer hollow channel means extending therethrough,
the hollow channel means of the three members being non-aligned when the conductor is in a non-energized mode so that fluid cannot pass through all of them, and



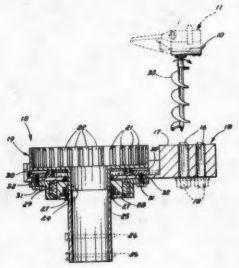
the central gland member movable to contact the inner gland member in response to pressurized fluid contacting the central gland member so that its hollow channel means aligns with the hollow channel means of the inner and outer gland members permitting the flow of the pressurized fluid into the hollow channel means of the outer gland member, through the hollow channel means of the central gland member, through and out of the hollow channel means of the inner gland member and thereby through and out from the fluid conductor for communication to the second well apparatus.

4,872,518

POWER CHAINSAW-ICE AUGER CONVERSION APPARATUS

Albert B. Crippin, Rte. #1 Percy Rd., Shingleton, Mich. 49884

Filed Aug. 10, 1988, Ser. No. 230,523
Int. Cl.[4] B25F *3/00*; F25C *5/04*
U.S. Cl. 175—18 **2 Claims**



1. An ice auger conversion apparatus for use in combination with a chain saw, said chain saw including, a drive sprocket and a plurality of spaced mounting bosses, said apparatus comprising,
a unitary housing member including a first and second housing portion,
said first housing portion rotatably mounting a drive means with said second housing portion including a plurality of through extending apertures for accepting said mounting bosses therethrough and mounting said housing member to said chain saw, and

said drive means including a forward auger mount and an elongate auger mountable on said auger mount, and

said drive means further includes a sprocket mounting means integrally formed to said drive means for operatively engaging said drive sprocket of said chain saw, and

wherein said drive means further includes a cylindrical sprocket drum formed with an interior cavity wherein the inner surface of said drum is formed with a series of sprocket teeth and recesses in complementary configuration to the drive sprocket of said chain saw, and

wherein said cylindrical sprocket drum includes a reduced diameter extension extending through said housing with an outer bearing positioned on one side of said housing and an inner bearing positioned on interior surface of said housing between said housing and said cylindrical sprocket drum, and

wherein a cylindrical auger mount is removably mounted to said reduced diameter extension by a plurality of mounting pins securing said auger mount to said reduced diameter extension, and

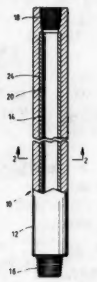
wherein said drive means further includes a plurality of bearing mount fasteners extending through said exterior bearing and said interior bearing to secure the bearings together and wherein the bearing mount fasteners are mounted within slots orthogonally adjustable relative to the axis of said drive means to vary the distance between the axis of said drive means and the through extending apertures formed within said second housing portion.

4,872,519

DRILL STRING DRILL COLLARS

Denis S. Kopecki, Salt Lake City, Utah, assignor to Eastman Christensen Company, Salt Lake City, Utah

Filed Jan. 25, 1988, Ser. No. 148,024
Int. Cl.[4] E21B *17/16*
U.S. Cl. 175—320 **9 Claims**



1. A non-magnetic drill collar, comprising:

a drill collar body member formed of a first non-magnetic material; and

a generally rigid corrosion resistant liner, said liner conformingly retained within said body member.

4,872,520

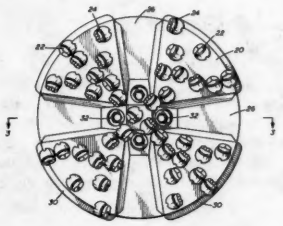
FLAT BOTTOM DRILLING BIT WITH POLYCRYSTALLINE CUTTERS

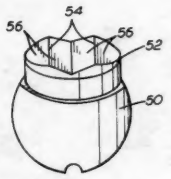
Jack R. Nelson, Houston, Tex., assignor to Triton Engineering Services Company, Houston, Tex.

Continuation of Ser. No. 004,380, Jan. 16, 1987, abandoned. This application Oct. 13, 1988, Ser. No. 256,934
Int. Cl.[4] E21B *10/46*
U.S. Cl. 175—329 **4 Claims**

1. An earth drilling bit comprising,

a body, said body having a flat bottom, a plurality of cutting elements positioned on the flat bottom, said elements including a stud carrying a polycrystalline diamond cutter, said cutters including an elongate straight, sharp chisel edged apex with a face on both sides of the apex extending backwardly from the apex, said apex extending generally





vertically with a slight back rake for providing a chisel surface for acting on the earth even when the cutter becomes worn, wherein the cutters include multiple apexes with a face extending backwardly on both sides of each apex.

4,872,521

PLATEN MODULE FOR A MODULAR MAILING MACHINE

Jovito N. Abellana, Trumbull, and Donald T. Dolan, Ridgefield, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Division of Ser. No. 135,186, Dec. 18, 1987. This application Aug. 24, 1988, Ser. No. 235,769
Int. Cl.[4] G01G *23/22*; B41J *3/28*
U.S. Cl. 177—25.15 **2 Claims**

1. A mailing machine comprised of a plurality of modules, each of said modules mounted in said mailing machine to perform a single process station, said mailing machine having a base and a plurality of support walls, wherein said modules include:

a scale module having means for weighing an envelope including,

a weighing plate having a plurality of slots formed in said weighing plate and a recess,

support means for supporting said weighing plate in vertically spaced relationship to the base of said mailing machine;

a transport module having means for positioning said envelope in said process station and ejecting said envelope from said process station including,

a frame,

a plurality of rollers rotatably mounted to said frame,

frame support means for supporting said frame below said weighing plate and selectively placing said frame in a first position such that a portion of said rollers extend through said slots of said weighing plate or a second position such that said rollers are repositioned generally below said weighing plate,

said frame and said frame support means be located gener-

ally between said mailing machine base and said weighing plate;

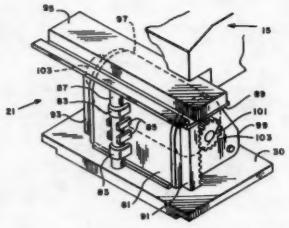
a meter module having a registration area and a printing means located in said registration area for imprinting an indicia on said envelope, said registration area being vertically aligned to and spaced above said recess in said weighing plate;

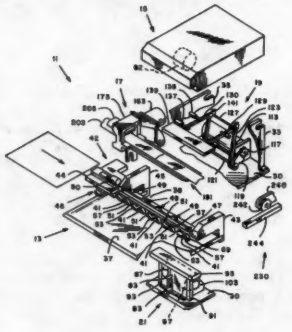
a platen module including,

a platen plate,

elastomeric member fixably mounted to a first surface of said platen plate,

platen support means for supporting said platen plate such that said elastomeric member is opposite said registration area of said meter module and such that said platen plate can be selectively positioned in a first position wherein said elastomeric member is in close proximity





to said printing means of said meter module and a second position wherein said elastomeric member is positioned generally below said weigh plate of said scale module, including,

a support wall, a rack post fixably mounted to said platen plate at one end, means for guiding and confining the displacement of said platen plate to a defined vertical path and, a drive motor having a gear fixablY mounted to the output shaft of said motor and in constant mesh with said rack post.

wherein said modules operate in a manner generally functionally independent of any other module, does not interfere with the operation of any other module and said modules can perform their respective function to said envelope while said envelope resides at said process station.

4,872,522

ELECTRONIC WEIGHING APPARATUS INCLUDING GUIDE ADJUSTING MEANS

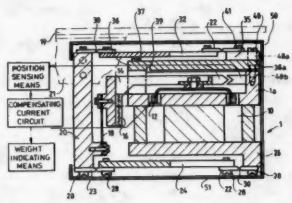
Peter Kunz, Gossau, Switzerland, assignor to Metter Instrumente AG, Greifensee, Switzerland

Filed Dec. 12, 1988, Ser. No. 283,828

Claims priority, application Switzerland, Feb. 19, 1988, 621/88

Int. Cl.[4] G01G *3/08, 23/14*

U.S. Cl. 177—229 **7 Claims**



1. In an electronic weighing apparatus of the type including parallelogram guide means for guiding a load receiver (**20**) for vertical movement relative to a frame (**1**), said guide means including horizontal parallel spaced upper and lower guide members (**32,24**), and first (**22**) and second (**23**) resilient bending bearing means connecting said guide members with said frame and with said load receiver, respectively, the invention which comprises: means for vertically adjusting the position of at least one of said first bending bearing means relative to said frame, said adjusting means including:

(a) a generally rectangular resilient cantilevered auxiliary guide plate (**36**) arranged adjacent and parallel with one of said guide members, said guide plate having a relatively low distortion characteristic and carrying at one end said at least one first bending bearing;

(b) means (**37**) connecting the other end of said guide plate with said frame, said auxiliary guide plate containing a continuous single horizontal groove (**39**) that extends transversely the entire width of said guide plate for defining therein an axis of bending extending normal to the direction between said one and other ends of said guide plate;

(c) means (**41**) connecting said one bending bearing with said one guide plate end; and

(d) means (**48**) for vertically adjusting said one guide plate end relative to said frame.

4,872,523

TORQUE SUSPENSION WEIGHING SCALE

Robert E. Skibinski, Tompkinsville, Ky., assignor to Mid-America Scale, Inc., Tompkinsville, Ky.

Continuation of Ser. No. 200,523, May 23, 1988. This application Jan. 19, 1989, Ser. No. 298,915

Int. Cl.[4] G01G *21/24*

U.S. Cl. 177—255 **4 Claims**

1. An apparatus for securely fastening a torque suspension member to a subframe and a weighing platform in a torque suspension weighing scale comprising:

weigh cable means separately surrounding said torque suspension member at a predetermined location thereof, said weigh cable means including;

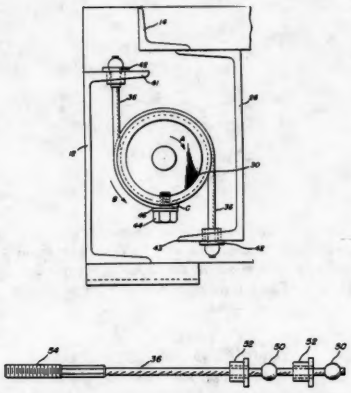
a ball member fixed to each exposed end of said weigh cable means;

a plurality of seat retention members axially movable along said weigh cable means and corresponding to each said ball member; and

means for supporting said ball and seat members in said predetermined locations of said weigh cable means;

wherein said ball member fits within said seat retention

member with respect to each said subframe and weighing platform on said means for supporting when torque is



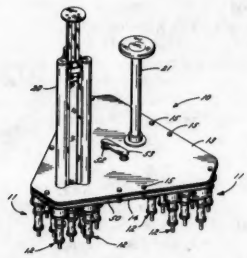
applied to said torque suspension member in response to force applied to said weighing platform.

4,872,524

WHEEL-LESS WALKING DOLLY

Chadwell O'Connor, 2024 Galaxy Dr., Newport Beach, Calif. 92660

Filed Apr. 13, 1988, Ser. No. 181,037
Int. Cl.[4] B62D *57/02*
U.S. Cl. 180—8.6 **8 Claims**



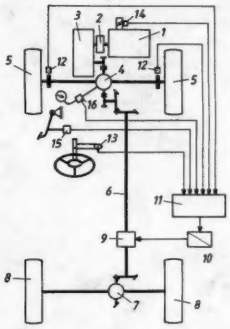
1. A movable platform comprising, in combination, a base plate, a plurality of extendable fingers mounted on said base plate for engagement with the underlying surface and for tilting movement relative to said base plate, means for driving said fingers cyclically between extended and retracted positions with one portion of the fingers being extended while the other portion are retracted, and means for controllably angling said tiltable fingers relative to said base plate so that the portion of fingers being extended exert an upward and angled force on the base plate with the horizontal component of that force moving the base plate in the direction the fingers tilt, said means for controllably angling said tiltable fingers being capable of tilting the fingers in a range of directions from the vertical so that the horizontal force will move the base plate in any horizontal direction within said range.

4,872,525

DRIVE SYSTEM FOR A MOTOR VEHICLE COMPRISING MEANS FOR PERMANENTLY DRIVING A FIRST PAIR OF WHEELS AND AUTOMATICALLY OPERABLE MEANS FOR SELECTIVELY DRIVING A SECOND PAIR OF WHEELS

Hans D. Sommer, Graz, Austria, assignor to Steyr-Daimler-Puch AG, Vienna, Austria

Filed Nov. 14, 1988, Ser. No. 271,101
Claims priority, application Austria, Nov. 23, 1987, A3073/87
Int. Cl.[4] B60K *17/344*
U.S. Cl. 180—197 **6 Claims**



1. In a drive system for a motor vehicle comprising means for permanently driving a first pair of wheels and automatically operable means for selectively driving a second pair of wheels in a four-wheel drive mode in dependence on the slip of the first pair of wheels,

the improvement residing in that

two speed sensors are operatively associated with respective ones of said permanently driven wheels and arranged to deliver actual speed signals representing the speeds of said permanently driven wheels,

a computer is provided, which is connected to said speed sensors and arranged to derive from said actual speed signals an actual speed difference and in which a first characteristic speed difference associated with a two-wheel drive mode and a second characteristic speed difference associated with a four-wheel drive mode are stored, said characteristic speed differences being specific to a vehicle for which the drive system is intended,

a final control element is provided for effecting in said drive system under the control of said computer a change between said four-wheel drive mode and a two-wheel drive mode in which only said first pair of wheels are driven,

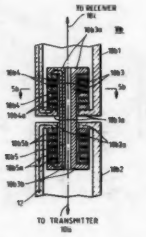
said computer is operable to make a comparison between said actual speed difference and a current reference speed difference which depends on that of said stored characteristic speed differences which is associated with the currently used one of said modes and to control said final control element for a change from the two-wheel drive mode to the four-wheel drive mode when said comparison indicates that said actual speed difference exceeds said current reference speed difference, and for a change from the four-wheel drive mode to the two-wheel drive mode when said comparison indicates that said actual speed difference is smaller than said current reference speed difference.

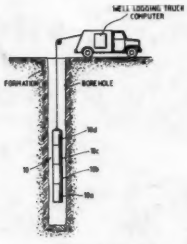
4,872,526

SONIC WELL LOGGING TOOL LONGITUDINAL WAVE ATTENUATOR

Albert H. Wignall, Friendswood, and David C. Hoyle, Houston, both of Tex., assignors to Schlumberger Technology Corporation, Houston, Tex.

Filed Jul. 18, 1988, Ser. No. 220,777
Int. Cl.[4] G01V *1/40*
U.S. Cl. 181—102 **9 Claims**





1. An attenuator for use with a well logging tool in attenuating a wave propagating longitudinally along said tool when said tool is disposed in a borehole of an oil well, comprising:

a plurality of layers of a first material, said first material including metal washers;

a plurality of layers of a second material interleaved with the plurality of layers of the first material, the second material including rubber-like washers; and

an inner member, the interleaved rubber-like washers and metal washers being wrapped around said inner member, said inner member including an outwardly directed flange on which one end of the interleaved rubber-like washers and metal washers rest.

4,872,527

SPEAKER SYSTEM

Bong H. Han, Suwon, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea

Filed May 27, 1988, Ser. No. 198,876
Claims priority, application Rep. of Korea, May 30, 1987, 1987-8660
Int. Cl.[4] H05K *5/00*
U.S. Cl. 181—160 **6 Claims**

1. A speaker system comprising:

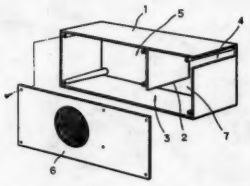
a partition of predetermined size dividing an interior of a cabinet into a speaker chamber, and a resonance chamber of a predetermined volume;

said speaker chamber including at least one speaker;

said partition including a first radiation port of predetermined area for passing reproduced sound waves; and

a second radiation port of predetermined area formed in a wall of the resonance chamber which does not face said first radiation port;

wherein the size of said partition and the area of said first radiation port are set in accordance with an upper limit



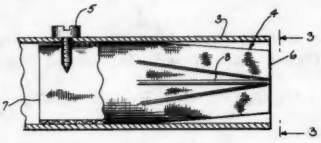
frequency of said reproduced sound waves, and the volume of said resonance chamber and the area of said second radiation port are set in accordance with a lower limit frequency of said reproduced sound waves.

4,872,528

MUFFLER CONSTRUCTION

Gary D. Goplen, Stoughton, and Lawrence F. Iles, Madison, both of Wis., assignors to Nelson Industries Inc., Stoughton, Wis.

Filed Aug. 1, 1988, Ser. No. 226,458
Int. Cl.[4] F01N *1/10*
U.S. Cl. 181—228 **18 Claims**



1. An improved muffler construction, comprising a muffler having an inlet to receive a gas and having an outlet conduit to discharge the gas, a generally conical metal screen disposed longitudinally within the conduit, said screen having a closed end and having a large diameter open opposite end disposed in engagement with the inner surface of said conduit, the interior of said conical screen being free of obstructions to gas flow.

4,872,529

LADDER STABILIZER ASSEMBLY

Michael I. Viets, 1647 N. Allen, Pasadena, Calif. 91104

Filed Jan. 11, 1989, Ser. No. 296,579
Int. Cl.[4] E06C *5/36*
U.S. Cl. 182—172 **22 Claims**

1. A ladder stabilizer assembly for stabilizing a ladder, the ladder having at least one side frame disposed in a vertical side frame plane, the side frame having an upper side frame end and a lower side frame end, the stabilizer assembly comprising:

(a) a stabilizer pole having an upper end and a lower end and comprising:

(i) a cylindrical, hollow outer pole member having an internal surface and an internal diameter; and

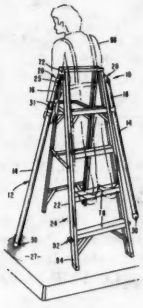
(ii) a cylindrical inner pole member having a first end, a second end, and an external diameter: the external diameter of the inner pole member being substantially the same as the internal diameter of the outer pole member, the first end of the inner pole member being longitudinally slidable within the outer pole member;

(b) cam means for alternatively locking and unlocking the first end of the inner pole member within the outer pole member, comprising:

(i) a first flexible cylindrical plug having a first end, a second end disposed opposite the first end, a diameter, a first plug longitudinal axis, and a radial surface parallel to the first plug longitudinal axis; the diameter of the first plug being substantially the same as the external diameter of the first end of the inner pole member; and the second end of the first plug being attached to the first end of the inner pole member such that the longitudinal axis of the inner pole member is coincident with the longitudinal axis of the first plug;

(ii) a second flexible cylindrical plug having a first end, a second end disposed opposite the first end, a diameter, a longitudinal axis, and a radial external surface parallel to the second plug longitudinal axis; the diameter of the second plug being substantially the same as the diameter of the first plug; and

(iii) plug attachment means for attaching the first plug to the second plug so that the radial surface of the first plug is parallel to the radial surface of the second plug



and so that the first end of the first plug and the first end of the second plug are alternatively rotatable about a common axis between an unlocked position, wherein the first plug longitudinal axis is coincident with the second plug longitudinal axis, and a locked position, wherein the first plug longitudinal axis is not coincident with the second plug longitudinal axis and wherein the radial external surface of the second plug impinges upon the inner surface of the outer pole member; and

(c) attachment means for attaching the upper end of the stabilizer pole to the upper end of the ladder side frame, comprising:

(i) hinge means for pivoting the lower end of the stabilizer pole away from the plane of the ladder side frame to an angle of at least about 30°; and

(ii) swivel means for pivoting the lower end of the stabilizer pole away from either side of a vertical plane running through the upper end of the ladder side frame and disposed perpendicular to the plane of the ladder side frame to angles of at least about ±45°.

4,872,530

SELF-LUBRICATING CENTRIFUGAL DRILLING MUD DEGASSER

Harry L. Burgess, Houston, Tex., assignor to Burgess and Associates Manufacturing, Inc., Houston, Tex.

Filed Aug. 15, 1988, Ser. No. 232,318

Int. Cl.[4] **F01M** *5/00;* **F16N** *3/00;* **F16H** *57/04;* **B01D** *47/00*

U.S. Cl. 184—6.12 **16 Claims**

1. In the combination of a motor with a drive shaft and a gear box containing a reduction gear arrangement wherein a motor is provided with a drive shaft to which a gear box is journaled, and wherein a lubricant in the gear box is heated during operation of the gear box, the improvement which comprises:

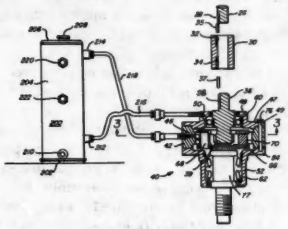
a. a gear box casing having a lubricant inlet port formed therein adjacent the top of the gear box,

b. a stationary interiorly-toothed ring gear fixed to said gear box casing below said inlet port, said ring gear having a lubricant outlet port formed between two adjacent teeth,

c. a system of reduction gears in said gear box operatively interconnected with said drive shaft and said ring gear,

d. a lubricant reservoir containing cool lubricant adjacent said gear box,

e. a lubricant inlet line interconnecting the lower portion of said lubricant reservoir with said gear box inlet port, and



f. a lubricant outlet line interconnecting the top portion of said lubricant reservoir with said gear box outlet port,

g. whereby, when said reduction gears are driven by said drive shaft on operation of said motor, rotation of said reduction gears about said ring gear will force a pulse of hot lubricant from said gear box through said outlet port and said outlet line to said lubricant reservoir and, whereby, a corresponding pulse of cool lubricant will flow from said lubricant reservoir through said inlet line to said inlet port for said gear box.

4,872,531

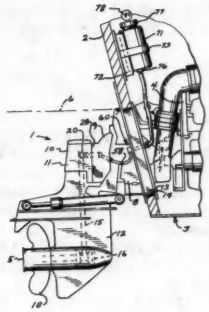
MARINE STERN DRIVE WITH THROUGH-HOUSINGS LUBRICATION SYSTEM

Gary L. Meisenburg, Fond du Lac; Francis E. Bertram, Malone, and Jack L. Golz, Oshkosh, all of Wis., assignors to Brunswick Corporation, Skokie, Ill.

Filed Feb. 26, 1988, Ser. No. 160,587

Int. Cl.[4] **F01M** *1/18*

U.S. Cl. 184—6.4 **13 Claims**



1. In a marine stern drive for mounting to an opening (14) disposed in the transom (2) of a boat (3) and with said stern drive being adapted for connection to an inboard mounted engine (4), the combination comprising:

(a) a stern drive assembly including a bell housing (9) and a drive shaft housing (10), and with said housings being removably assembleable together,

(b) interconnected lubricant fluid passage means (21,23,26) disposed in said housings,
(c) fluid flow control valve means (30,31) disposed in said passage means, said valve means being open when said bell housing and said drive shaft housing are assembled, and said valve means being automatically closed when said housings are disassembled,
(d) said passage means including a first passage (21) disposed in one of said housings (10) and a second passage (23) disposed in the other of said housings (9),
(e) said first and second passages having outer end portions disposed in registry when said housing are assembled,
(f) said fluid flow control valve means including opposed first (30) and second (31) valves disposed in said respective first and second passages,
(g) said first and second valves having cooperatively engaging means (35,52,43) for opening both said valves when said housings are assembled,
(h) said first and second valves each having means (33,35,36; 47,54,55) for automatically closing the respective valve upon disengagement of said cooperatively engaging means when said housing are disassembled,
(i) said first and second valves (30,31), when closed, forming means to disconnect said fluid passage means and isolate lubricating fluid inwardly of the outer end portions of said first and second passages (21,23), respectively,
(j) said first valve (30) comprising:
(1) a first valve seat (33) and first seat engaging element (35) disposed in said first passage (21),
(2) and a first spring (36) disposed in said first passage, said spring biasing said first seat engaging element against said first seat when said housings are disassembled,
(k) said second valve (31) comprising:
(1) a generally cylindrical valve housing (38) disposed in said second passage (23) and having a portion (51) abutting an inner end (25) of said second passage,
(2) said valve housing forming an inwardly facing second valve seat (47) and an outwardly extending nose (43),
(3) an elongated plunger (52) disposed within said valve housing, and with said plunger having an outer tip portion (52*a*),
(4) a second seat engaging element (54) disposed on said plunger,
(5) and a second spring (55) weaker than said first spring (36), said second spring biasing said second seat engaging element against said second seat when said bell housing and drive shaft housing are disassembled so that said plunger tip portion extends outwardly beyond said nose.

4,872,532

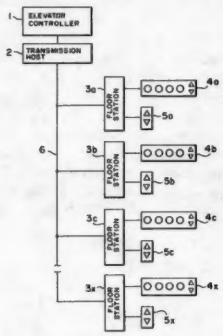
SIGNAL TRANSMISSION METHOD AND SYSTEM IN ELEVATOR EQUIPMENT

Toshimitsu Tobita; Hiromi Inaba; Masachika Yamazaki, all of Katsuta; Masato Suzuki, Ibaraki; Yuzo Morita, Hitachi; Toshiki Kajiyama, Katsuta; Kiyoshi Nakamura, Katsuta, and Kenji Yoneda, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 4, 1988, Ser. No. 228,229
Claims priority, application Japan, Aug. 12, 1987, 62-199780; Jan. 25, 1988, 63-13795
Int. Cl.[4] B66B *3/00*
U.S. Cl. 187—121 **20 Claims**

1. A signal transmission method in elevator equipment wherein an elevator controller is connected to a plurality of apparatus installed at elevator stops on respective floors through a main station, remote stations and a common transmission line, and serial transmission of signal is effected between said controller and the respective apparatus at elevator stops on respective floors, said method comprising:

effecting transmission/reception of a signal unique to each of said plurality of apparatus on respective floors during a first period; and



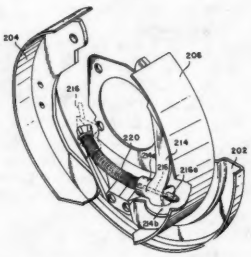
effecting transmission/reception of a signal common to said plurality of apparatus on respective floors during a second period.

4,872,533

BRAKE APPARATUS WITH BLIND CABLE INSTALLING MEANS

Billy G. Boyer, Moberly; Lloyd M. Nelson, Blackwater; Wayne L. Soucie, Columbia, and William K. Hayes, Fayette, all of Mo., assignors to Orscheln Co., Moberly, Mo.

Filed Nov. 23, 1988, Ser. No. 275,390
Int. Cl.[4] F16D *51/00*
U.S. Cl. 188—2 D **9 Claims**



1. A blind-connection type parking brake assembly for operating brake shoe means relative to a brake surface associated with a wheel of a vehicle, comprising:
(a) a backing plate (102, 202);
(b) a flat parking brake lever (114, 214) pivotally connected at one end with said backing plate for pivotal movement parallel with and spaced from said backing plate;
(c) a helical guide spring (120, 220) extending at one end through a first opening contained in said backing plate, said parking brake lever being provided at its other end with a transversely arranged spring support portion (114*a*, 214*a*) for supporting the other end of said guide spring;
(d) a co-axial parking brake cable assembly including a flexible resilient inner cable member (116, 216) extending through said guide spring and terminating at one end in an enlarged extremity (116*a*, 216*a*); and
(e) means connecting said cable member one end with said lever one end, including an integral ramp portion (114*b*, 214*b*) opposite and spaced from said spring support por-

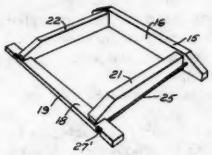
tion, said ramp portion having a ramp surface (**114c, 214c**) facing and inclined at an acute angle (α) relative to the axis of said spring support portion, said ramp surface being contained in a plane that is generally parallel with the longitudinal axis of said lever, said ramp portion containing a cable mounting opening (**140, 240**) so arranged and of such a size and configuration that said enlarged inner cable member extremity is operable for successive introduction through said backing plate opening, through said spring, and through said spring support portion into sliding engagement with said ramp portion, whereby during the blind connection of said inner cable member with said lever, the enlarged end extremity of said inner cable member initially rides up said ramp portion and subsequently extends through the ramp opening for return in the opposite direction toward a connected position in which the inner cable member is retained in said mounting opening by the engagement of said enlarged extremity with the rear surface of said ramp portion.

4,872,534

WHEELED CHAIR RESTRAINT

Vincent R. Corsi, 161 Princeton Ave., Coventry, R.I. 02816, and Gaetano W. Citrone, 9 Gordon St., Johnston, R.I. 02919

Filed Oct. 21, 1988, Ser. No. 260,577
Int. Cl.[4] B60T *3/00*
U.S. Cl. 188—32 **5 Claims**



1. A restraint apparatus for a wheeled patient chair having front and rear pairs of wheels comprising

a first bumper bar adapted to engage one pair of wheels of a chair;

a second bumper bar of a height substantially half the height of the first bar spaced from and substantially parallel to the first bar and adapted to engage the other pair of wheels;

means maintaining the first and second bars in a spaced relation whereby the wheeled chair may with external assistance be forced over the second bar to move the patient.

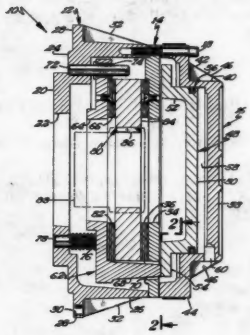
4,872,535

BRAKE

Leonid Dayen, Plymouth, and Charles D. Raines, Blaine, both of Minn., assignors to Horton Manufacturing Co., Inc., Minneapolis, Minn.

Filed Sep. 30, 1988, Ser. No. 252,183
Int. Cl.[4] F16D *65/24*
U.S. Cl. 188—170 **20 Claims**

1. Brake for the end of a shaft such as the shaft of an electric motor comprising, in combination: a generally bowl-shaped housing including a radially extending annular flange terminating in an axially extending annular flange; a torque plate; means extending between the radially extending annular flange and the torque plate for reciprocally mounting and rotatably relating the torque plate relative to the housing; a drive disc rotatably related to the shaft; means located on the opposite side of the drive disc than the torque plate and secured to the axially extending annular flange of the housing for moving the torque plate away from the drive disc, with the means for moving the torque plate away from the drive disc including an axially movable piston, and lugs integrally formed on the torque plate for abutting with the piston, with the lugs extending from the



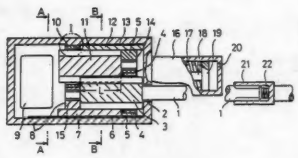
torque plate located radially outwardly of the drive disc; and means for moving the torque plate towards the drive disc.

4,872,536

HYDRAULIC PUMPS OR MOTORS AND HYDROSTATIC TRANSMITTING SYSTEMS

Zheng Yue, Room 105, Building 15, (Old) Beicun, Nankai University, Tianjin, China

Filed Sep. 23, 1987, Ser. No. 100,103
Claims priority, application Switzerland, Sep. 24, 1986, 86106471
Int. Cl.[4] F16D *57/00;* **F04C** *2/18, 15/04*
U.S. Cl. 188—290 **7 Claims**



1. An axial variable capacity gear pump comprising:

a casing with an inlet and an outlet;

an axially movable gear and an axially fixed gear mounted in said casing in a meshing relationship for rotation about their respective axes, said axially movable gear being movable along an axial direction relative to the axially fixed gear;

radial sealing means arranged between an inner surface of said casing and teeth of said gears for providing radial seals therebetween; and

axial sealing means for providing seals at either axial side of said gears, said radial sealing means and said axial sealing means each having an axially fixed member and also having an axially movable member which are movable together with said axially movable gear along said axial direction so as to change a length of a sealed working chamber defined between said gears and thereby change a delivery capacity per revolution of the pump, said axially movable member of said axial sealing means having a slidable end plate, a ring gear rotatably supported in said sliding end plate and slidably sleeved on said axially fixed gear so as to move axially together with said sliding end plate, and a ring gear-shaped elastic gasket arranged between said axially fixed gear and said ring gear for providing a seal therebetween, said axially fixed member of said

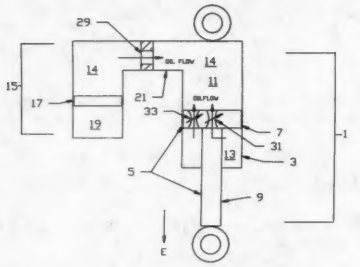
axial sealing means having a fixed end plate, and an axially fixed ring gear rotatably supported in said fixed end plate and sleeved on said axially movable gear, and a ring gear-shaped elastic gasket arranged between said axially movable gear and said axially fixed ring gear for providing a seal therebetween.

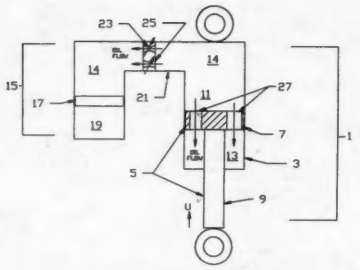
4,872,537

ADJUSTABLE DAMPER MEANS FOR SHOCK ABSORBER

Brian Warner, 84 Eastbourne, Beaconsfield, Quebec, Canada H9W 5G9

Filed Jun. 6, 1988, Ser. No. 203,315
Int. Cl.[4] F16F *5/00, 9/34, 9/44, 15/16*
U.S. Cl. 188—319 **7 Claims**





1. A shock absorber, comprising:

a piston and cylinder arrangement comprising a cylinder, and a piston and piston rod assembly slidably mounted in said cylinder and dividing said cylinder into a first chamber and a second chamber, said cylinder being filled with a damper-fluid;

an auxiliary tank;

a flow channel permitting flow of said damper-fluid between said cylinder and said auxiliary tank;

wherein, during each compression stroke of said piston and piston rod assembly, the volume of said first chamber is decreased and the volume of said second chamber is increased; and

during each extension stroke of said piston and piston cylinder arrangement, the volume of said first chamber is increased and the volume of said second chamber is decreased;

and including:

a first restriction means associated with said piston and piston rod assembly and substantially controlling the low velocity flow of said damper-fluid during each said extenstion stroke, and a second restriction means associatd with said piston and piston rod assembly substantially controlling high velocity flow of said damper-fluid during each said extension stroke; and

a third restriction means in said flow channel substantially controlling the low velocity flow of said damper-fluid during each said compression stroke and a fourth restriction means in said flow channel substantially controlling the high velocity flow of said damper-fluid during each said compression stroke;

and further including first means permitting subtantially unrestricted flow of said damper-fluid through said piston and piston rod assembly during each said compression stroke, and a second means permitting substantially unrestricted flow of said damper-fluid through said flow channel during each said extension stroke;

said piston and piston rod assembly comprising a truncated cylindrical piston head having a top surface and a bottom surface, a central opening extending through said piston head, said piston rod comprising a hollow piston rod, an inner cylinder slidably mounted in said hollow piston rod, said inner cylinder being concentric with said piston head, an opening in the side wall of said hollow piston rod;

wherein, said first restriction means comprises said opening in said side wall, said first restriction being variable by the inner cylinder linearly sliding up and down in said hollow piston rod to thereby adjust the size of said opening in said side wall;

said second restriction means comprising a blow off valve;

said second restriction means further comprising two openings extending through said piston head from the top surface to the bottom surface thereof;

a plate member comprising said blow off valve and including a central opening and two protrusions, each protrusion being mounted to be aligned with and to extend into a respective opening;

said plate member being mounted over the top surface of said piston head;

an adjustment rod extending through said central opening and said inner cylinder, and being concentric to said inner cylinder, and including a cap at the top end thereof;

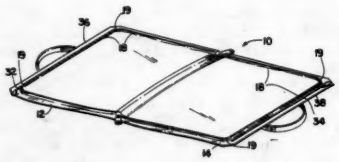
a spring between said cap and said plate member, the tension of said spring being adjustable by said adjustment rod whereby said second restriction means is also variable.

4,872,538

ARTICLE OF LUGGAGE OR THE LIKE AND METHOD OF MAKING SAME

James L. Fournier, N. Bennington, Vt., assignor to JLF Designs, Inc., North Bennington, Vt.

Filed Feb. 26, 1988, Ser. No. 161,006
Int. Cl.[4] A45C *3/02, 13/10*
U.S. Cl. 190—111 **24 Claims**



1. A stitched case comprising

a first generally rectangular side wall element,

a second generally rectangular side wall element, the first side wall element being spaced from the second side wall element, and

at least a joining wall element disposed between and joining said first and second side wall elements, said joining wall element having opposite first and second surfaces, and being joined to an inner surface of a first side wall element by the steps of:

disposing said joining wall element upon said first side wall element, generally along a first edge of said first side wall element, with the first surface of said joining wall element in opposition to the inner surface of said first side wall element, said joining wall element having an outer edge,

joining said joining wall element to said first side wall element along a first joining region adjacent and generally parallel to the first edge of said first side wall element, said first joining region spaced on said joining wall element from the outer edge of said joining wall element extending toward said second side wall element,

at a region adjacent a second edge of said first side wall element, folding said joining wall element in a manner to dispose the second surface of said joining wall element in opposition to the inner surface of said first side wall element,

joining said joining wall element to said first side wall element along a second joining region adjacent and generally parallel to the second edge of said first side wall element, said second joining region spaced on said joining wall element from said outer edge of said joining wall element,

whereby said joining wall element is adapted to extend from connection with said first side wall element adjacent and generally parallel to said first and second edges.

4,872,539

CLUTCH RELEASE BEARING FOR AN AUTOMOBILE VEHICLE AND MEANS FOR THE INSTALLATION THEREOF

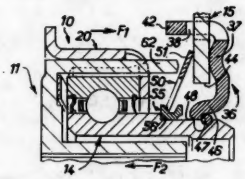
Christian Gay, Paris, and Philippe Lassiaz, Boulogne, both of France, assignors to Valeo, Paris, France

Filed Jul. 14, 1988, Ser. No. 218,996

Claims priority, application France, Jul. 22, 1987, 87 10362

Int. Cl.[4] F16D *23/14*

U.S. Cl. 192—98 **15 Claims**



1. A clutch release bearing suitable for an automobile vehicle, of the kind comprising an operating element adapted to be acted on by a control element such as a clutch release fork, and a driving element connected axially to said operating element to act in traction and thus adapted to enable the assembly to exercise a pulling effect on the declutching device of the clutch to be controlled, said driving element being provided for this purpose with a coupling device disposed annularly around the axis of the assembly and being at least partly engaged with an annular groove, and being elastically deformable radially; and elastic bearing means operable to bear axially on said declutching device whilst bearing axially on said driving element, wherein said elastic bearing means comprise a bistable resilient washer capable of adopting either one of two axially inverse configurations, namely a first, storage configuration in which the washer ensures that the coupling device is kept in a relatively contracted position, and a second, operating configuration in which, having freed said coupling device, the washer is adapted to bear axially on the declutching device of the clutch.

4,872,540

CLUTCH CONTROL METHOD FOR FLUID TORQUE CONVERTER OF VEHICULAR TRANSMISSION

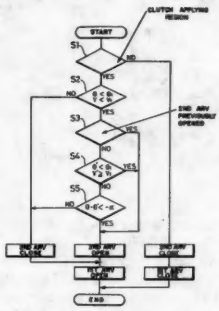
Noboru Sekine; Takashi Aoki, and Satoshi Terayama, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 9, 1987, Ser. No. 36,567

Claims priority, application Japan, Apr. 10, 1986, 61-81198

Int. Cl.[4] F16H *45/02*; B60K *41/02*

U.S. Cl. 192—0.076 **6 Claims**



1. A method for controlling a clutch in a fluid torque converter for a vehicular transmission of a vehicle, said torque converter connected on an input side to an engine having a throttle valve for controlling a throttle opening, and connected on an output side to an auxiliary transmission, said converter being provided with a clutch to which a high force is applied for positively connecting the input and output sides of said converter when the vehicle is operated above a predetermined speed range and to which a relatively low force is applied to allow slippage when the vehicle is operated within said predetermined speed range with the slippage varying inversely relative to the vehicle speed, the method comprising the steps of, determining the throttle opening and the rate of change of the throttle opening, and increasing the force applied to the clutch to a valve higher than the relatively low force applied for a given throttle opening for reducing slippage at that given throttle opening when the throttle opening is lower than a predetermined reference throttle opening and the throttle opening is decreasing at a rate higher than a predetermined rate value.

4,872,541

VENDING MACHINE HAVING SLAVE DISPENSING UNITS

Yukichi Hayashi, Sakada, Japan, assignor to Kabushiki Kaisha Nippon Coinco, Tokyo, Japan

Continuation of Ser. No. 734,661, May 15, 1985, abandoned. This application Mar. 10, 1989, Ser. No. 323,041

Claims priority, application Japan, May 27, 1984, 59-106730

Int. Cl.[4] G07F *5/22*

U.S. Cl. 194—217 **13 Claims**

10. A vending machine system comprising:

a single master vendor including a coin mechanism and a vend possible judgment circuit, and

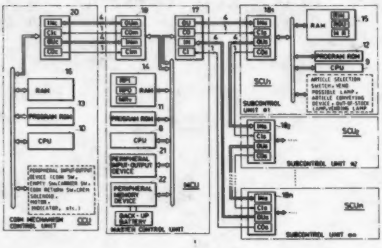
a plurality of slave vendors controlled by said master vendor, each having a plurality of article dispensers,

said master vendor having a master control unit for controlling the operation of all of the respective slave vendors,

each of said slave vendors having a respective subcontrol unit which performs transmission and receiving of information to and from the master control unit and which controls the article vending operation of the respective

slave vendor in response to the information provided from the master control unit, and wherein;

the output of said master control unit is applied to the first subcontrol unit, outputs and inputs of the first and nth subcontrol units are sequentially connected in series, and the output of the nth subcontrol unit is connected to the input of said master control unit, whereby the respective



subcontrol units are serially connected to said master control unit; and wherein

each of said units comprises means for prohibiting receipt of input data and for outputting the input data instantly for transfer to the sequentially adjacent subcontrol unit, when said number data does not indicate the number of said subcontrol unit.

4,872,542

STEEP ANGLE CONVEYOR

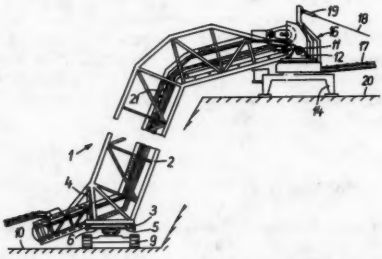
Gregor Enneking, Neuenkirchen, Fed. Rep. of Germany, assignor to Fried. Krupp Gesellschaft mit beschränkter Haftung, Essen, Fed. Rep. of Germany

Filed Dec. 14, 1987, Ser. No. 132,446

Claims priority, application Fed. Rep. of Germany, Dec. 13, 1986, 3642718

Int. Cl.[4] B65G *41/00*

U.S. Cl. 198—312 **7 Claims**



1. A steep angle conveyor for conveying bulk materials from a lower level to an upper level, said conveyor comprising: a one-piece bridge structure having two opposed ends each arranged to be disposed at a respective one of the levels; an endless conveyor extending along said bridge structure; a first intermediate frame to which is articulated that one of said ends which is arranged to be disposed at the lower level; a second intermediate frame to which is articulated that one of said ends which is arranged to be disposed at the upper level; first and second supporting devices each arranged to support a respective one of said intermediate frames while permitting each of said intermediate frames to be rotatable relative to its associated supporting device; and means supporting said first intermediate frame on said first supporting device for angularly adjusting said intermediate frame into a horizontal orientation relative to said first support device and said bridge structure so as to permit said first intermediate frame to be displaceable relative to said first supporting device in a horizontal direction

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4,872,543

CONVEYOR SYSTEM FOR ROD-LIKE ARTICLES

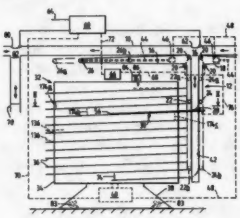
Dennis Hinchcliffe, Orpington, England, assignor to Molins PLC, Milton Keynes, England

Filed Apr. 22, 1987, Ser. No. 41,197

Claims priority, application United Kingdom, Apr. 23, 1986, 8609894

Int. Cl.[4] B65G *37/00*

U.S. Cl. 198—347 **29 Claims**



1. A conveyor system for rod-like articles, comprising means defining a path for rod-like articles in multi-layer stack formation, said path having at least one movable end, said movable end including means for transferring articles in a first direction between said movable end of said path and receiving means at different locations, said transferring means and said receiving means being arranged so that articles may be reversibly transferred in multi-layer stack formation between said movable end and said receiving means without substantial change in said multi-layer stack formation, conveyor means for moving articles on said path, and means for moving said movable end in a second direction, different from said first direction, between said different locations to allow transfer of articles between the path and the receiving means at said different locations.

4,872,544

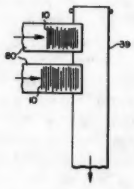
APPARATUS FOR ORIENTED STRAND LAY-UP

Mark T. Churchland, Vancouver, and Walter W. Schilling, Delta, both of Canada, assignors to MacMillan Bloedel Limited, Canada

Continuation of Ser. No. 882,372, Jul. 7, 1986, abandoned, which is a continuation of Ser. No. 738,542, May 28, 1985, Pat. No. 4,706,799, which is a division of Ser. No. 547,578, Nov. 1, 1983, Pat. No. 4,563,237. This application Feb. 9, 1988, Ser. No. 154,440

Int. Cl.[4] B65G *47/26*

U.S. Cl. 198—382 **8 Claims**



1. An apparatus for continuously laying elongated members at least about one foot long in a lay-up mat with each member oriented substantially in the longitudinal direction of the lay-up

mat, the mat being formed into an oriented, compressed and bonded composite product in which the average vertical angle of elongated members therein is not more than about 2 degrees, comprising:

a lay-up trough having sides and a moving belt base; and

at least two transverse conveyors for advancing the elongated members in a direction substantially normal to their length, each of the transverse conveyors having guide means which are oscillatingly movable with respect to the belt base to distribute the members laterally across the belt base, the transverse conveyors and guide means being positioned to deposit the elongated members onto said moving belt base with the length of the members being substantially parallel to a direction of advancement of the moving belt base and over a length of said belt base that is at least as long as the greater of (i) one and one-half times the length of the elongated members and (ii) 30 times the final thickness of the composite product.

4,872,545

APPARATUS FOR HANDLING BODIES OF GENERALLY CYLINDRICAL CONFIGURATION

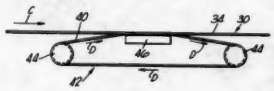
Stephen C. N. Brown, Preston, and Andrew W. Ashley, Plymouth, both of United Kingdom, assignors to British Nuclear Fuels plc, Warrington, United Kingdom

Filed May 16, 1988, Ser. No. 194,214

Claims priority, application United Kingdom, Jun. 5, 1987, 8713213

Int. Cl.[4] B65G *47/24*

U.S. Cl. 198—394 **21 Claims**



1. Apparatus for handling bodies of generally cylindrical configuration comprising:

(a) means for conveying the bodies in serial fashion along a predetermined path, the conveying means being arranged to support the bodies in one or other of two stable modes, a first mode in which the body is contacted by the conveying means at different points around its generally cylindrical surface such that the body axis extends generally parallel to the direction of conveyance and a second mode in which the body is contacted by the conveying means at both its cylindrical surface and one of its end faces such that the body is supported in tilted fashion with its axis extending laterally of the direction of conveyance, and

(b) reorientating means disposed at at least one position along the path of conveyance for contacting those bodies (if any) in said second mode of support and exerting a progressive lifting action on the bodies during the contact phase between the bodies and the reorientating means so as to cause a reorientating of said second mode bodies into the first mode of support while allowing those bodies in said first mode of support to remain in said first mode.

4,872,546

SCREW CONVEYOR DEVICE

Erich A. Hindermann, Sagirain, CH-6403 Küssnacht a.R., Switzerland

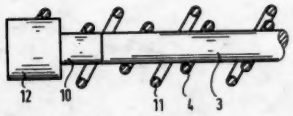
Continuation of Ser. No. 30,278, Mar. 23, 1987, abandoned, which is a continuation of Ser. No. 729,565, May 2, 1985, abandoned. This application Dec. 22, 1987, Ser. No. 136,535

Claims priority, application Fed. Rep. of Germany, Jan. 16, 1985, 3501259

Int. Cl.[4] B65G *33/26*

U.S. Cl. 198—659 **10 Claims**

1. A screw conveyor device for pourable material comprising a tubular housing which has an inlet opening for material to be conveyed and has an outlet opening for conveyed material spaced from said inlet, a rotatable flexible central shaft extending through the housing, at least one drivable feed coil surrounding the rotatable shaft, a retaining member, consisting of an elastic material, supporting said at least one feed coil at both



ends of the flexible core, means rotatable mounting the shaft at both ends of the housing, and a drive motor at one end of the housing connected to drive the shaft and said at least one feed coil to rotate; wherein said at least one feed coil is connected at at least one end to the flexible shaft in a manner precluding relative rotation and wherein said at least one feed coil is supported without clearance on the flexible shaft.

4,872,547

CLAMPING MEANS FOR ATTACHING THE ENDS OF A CONVEYOR COIL SPRING TO A JOURNAL PIN

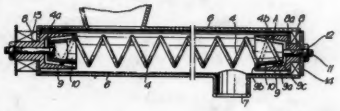
Ingolv Helland, N-4330, Algard, Norway

Filed May 17, 1988, Ser. No. 195,003

Claims priority, application Norway, May 21, 1987, 872136

Int. Cl.[4] B65G *33/26*

U.S. Cl. 198—659 **4 Claims**



1. A clamping apparatus for attaching at least one end of a conveyor coil spring to a journal pin in a conveyor tube, characterized in a clamping sleeve with inner walls converging from an opening at one end of the sleeve towards another end of the clamping sleeve and being secured to the journal pin, and a wedge shaped clamping member for insertion into the clamping sleeve, a screw bolt which is secured to the narrow end of the clamping member and extends through, and projects from an axial bore in the journal pin, and a nut on a free end of the screw bolt, said clamping sleeve and the clamping member together forming an annular space for receiving and fixing the end of the conveyor coil spring when the nut is tightened.

4,872,548

INTERMITTENTLY-DRIVEN BELT CONVEYOR

Satoru Masuda, Yokohama, and Hiroyuki Ishigami, Tokyo, both of Japan, assignors to Otsuka Koki Kabushiki Kaisha, Japan

Continuation of Ser. No. 37,635, Apr. 13, 1987, abandoned. This application Sep. 6, 1988, Ser. No. 247,438

Claims priority, application Japan, Jun. 5, 1986, 61-131020

Int. Cl.[4] B65G *23/38*

U.S. Cl. 198—859 **6 Claims**

1. A belt conveyor comprising a support frame established by side body members, two rollers supported on one side body members at opposite ends of the support frame, a belt stretched between the rollers and means for feeding the belt intermittently, said feeding means including:

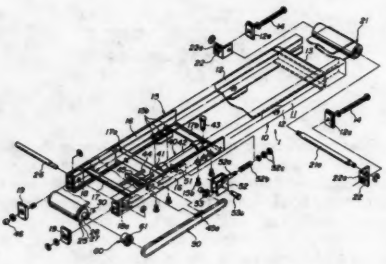
a cylinder having an opening rod reciprocatable in a moving direction of the belt, said cylinder mounted within said support frame between said side body members and between upper and lower runs of the belt;

a drum including a one way clutch mechanism therein and having a sprocket wheel mounted therearound fitted

around a transmission shaft integral with one of the rollers;

a chain trained over said sprocket wheel mounted around the drum including the one way clutch mechanism therein;

said chain connected to the operating rod of the cylinder to



transmit movement to the transmission shaft through the drum and one way clutch mechanism via the sprocket wheel, wherein said cylinder has a longitudinal axis extending substantially parallel to the body members and is formed with a diameter approximately less than the height of said body members, said cylinder being further located between opposite ends of said body members.

4,872,549

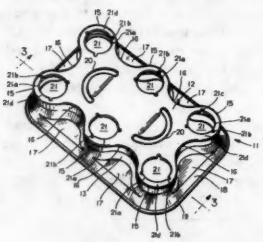
CARRIER FOR BOTTLES

Aldo Panzzolo, Perrysburg, Ohio, assignor to Owens-Illinois Plastic Products Inc., Toledo, Ohio

Continuation of Ser. No. 663,651, Oct. 22, 1984. This application Feb. 24, 1986, Ser. No. 834,133

Int. Cl.[4] B65D *75/00*

U.S. Cl. 206—158 **3 Claims**



1. A package comprising, in combination:

a plurality of filled and capped bottles, each of said bottles being capped with a molded thermoplastic closure that is provided with a tamper-indicating band on the underside thereof, said tamper-indicating band being of the heat-shrinkable type; and

a unitary carrier supportably receiving the upper portions of said bottles to permit the carrying of said bottles from said upper portions said carrier being formed from a sheet of a semi-rigid thermoplastic material by thermoforming and further comprising:

a top panel, said top panel being disposed adjacent said underside of said molded thermoplastic closure of each of said filled and capped bottles;

wall means extending downwardly from said top panel to surround said upper portions of said bottles; and

a plurality of generally circular apertures located in said top panel, each of said generally circular apertures receiving the neck of a bottle and comprising a maximum of three tabs extending radially inwardly from the periphery of said aperture, said tabs extending in a generally circular array around said aperture to support the bottle received in said aperture from the underside of said closure, said tabs being spaced apart from one another, the arcuate extent of each of said tabs being substantially greater than the arcuate extent of the space between adjacent tabs, said arcuate extent of each of said tabs being sufficient to prevent said tab from deflecting upwardly under said tamper-indicating band of said closure prior to any attempt to remove said bottle from said aperture of said unitary carrier.

4,872,550

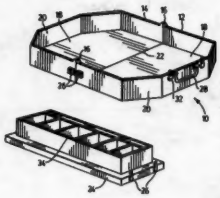
DUAL PURPOSE CARRYING CONTAINER

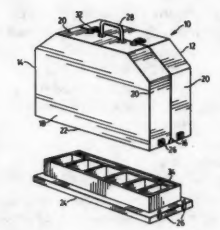
Frank Stranges, 7296 Woodgate St., Niagara Falls, Ontario, Canada L2J 3Z5

Filed Feb. 26, 1988, Ser. No. 160,957

Int. Cl.[4] B65D *85/20*; A63F *3/00*

U.S. Cl. 206—315.1 **3 Claims**





1. A carrying container comprising:

a first section having a first substantially planar surface and a wall surrounding the first substantially planar surface on all but one open side;

a second section having a second substantially planar surface and a wall surrounding the second substantially planar surface on all but one open side;

the first and second sections being hinged together at points on the walls on each section adjacent the open sides;

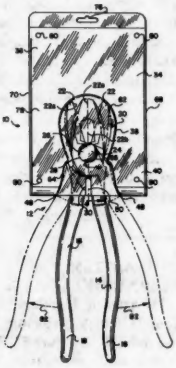
the first and second sections being operable from a first position in which the walls of the first and second sections lie adjacent each other to define an interior cavity to a second position in which the first substantially planar surface is coplanar with and contiguous to the second substantially planar surface; and

a base detachably securable to the first and second sections when the first and second sections are in the first position.

4,872,551
WORKING CLAMSHELL BLISTER PACKAGE FOR PLIERS OR SIMILAR HAND TOOLS

Brian S. Theros, Lemont, Ill., assignor to Klein Tools Corporation, Chicago, Ill.

Filed Mar. 8, 1989, Ser. No. 320,501
Int. Cl.[4] B65D *73/00*
U.S. Cl. 206—349 **16 Claims**



1. A working clamshell blister package for holding and displaying a pliers or similar hand tool having two pivoting members secured at a pivot junction, each such member having a handle at one end and a working portion at the other end, said package comprising:

a first panel having an upper end, a lower end and a recess formation;

a second panel having an upper end, a lower end and a recess formation, said second panel being a mirror image of said first panel;

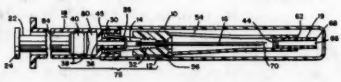
said lower ends of said panel having portions being joined to form a hinged base portion, said base portion having a pair of openings with a bridge formation disposed therebetween, said openings being dimensioned to accommodate the handles of the tool therethrough and to allow for pivoting action thereof, said bridge formation being configured to support the pivot junction of the pliers;

said panels being configured so that when placed in contacting relation to each other, a compartment is formed therebetween by said recesses for accommodating the working portion of the pliers and allowing at least restricted pivoting action thereof.

4,872,552
SAFETY PACKAGING FOR HYPODERMIC SYRINGES WITH NEEDLES AND THE LIKE

Larry E. Unger, Gadsden, Ala., assignor to Mid-South Products Engineering, Inc., Gadsden, Ala.

Filed Nov. 16, 1988, Ser. No. 271,873
Int. Cl.[4] A61M *5/00, 5/32*
U.S. Cl. 206—365 **17 Claims**



1. A needle guard package for protecting persons from accidental pricking by a hypodermic type needle having a first end secured within a needle hub and comprising;

a first generally tubular section of said needle guard package securable to and surrounding at least a portion of said needle hub;

a second generally tubular section of said needle guard package having an elongated slot formed therein;

a hinge connecting together said first and second sections of said needle guard package;

said second section of said needle guard package positioned in a first position around said needle so that when said second section is pivoted away from said needle on said hinge said needle passes through said longitudinal slot to expose the point of said needle for use;

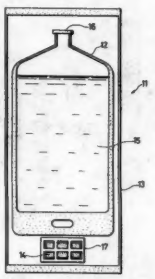
said second section having the end thereof opposite its hinged end extending beyond the needle point; and

a plastic insert frictionally held within the extended end of said second section a predetermined distance from the needle point and movable into the said needle point to lock said needle permanently therein after use of said needle and after said second section has been moved into its first position surrounding said needle.

4,872,553
MEDICAL FLUID-FILLED PLASTIC CONTAINER AND METHODS OF MAKING SAME

Tatsuo Suzuki, Machida, and Keinosuke Isono, Kawaguchi, both of Japan, assignors to Material Engineering Technology Laboratory, Incorporated, Tokyo, Japan

Filed Dec. 29, 1987, Ser. No. 139,312
Int. Cl.[4] B65D *85/00*
U.S. Cl. 206—524.4 **10 Claims**



1. A fluid-filled plastic container comprising (a) a sealed inner envelope of plastic material filled with a fluid containing a component subject to deterioration by oxygen, said inner envelope including outlet means for changing said fluid into said inner envelope, (b) a deoxidizer, and (c) a sealed outer envelope of plastic material enclosing both said fluid-filled inner envelope and said deoxidizer wherein said deoxidizer comprises a solid deoxidizer which is enclosed in said outer envelope so that a space is left around said solid deoxidizer.

4,872,554
REINFORCED CARRIER WITH EMBEDDED RIGID INSERT

Daniel R. Quernemoen, Chaska, Minn., assignor to Fluoroware, Inc., Chaska, Minn.

Continuation of Ser. No. 69,699, Jul. 2, 1987, abandoned. This application Aug. 23, 1988, Ser. No. 238,989
Int. Cl.[4] B65D *85/48;* B05C *13/02;* F27D *5/00*
U.S. Cl. 206—454 **16 Claims**

1. A rigid carrier for retaining a multiplicity of thin wafers in closely spaced but continuously separated confronting relation to each other and in a stack-like arrangement to accommodate liquid and gaseous spray processing and the many high and

low temperature processing steps of the wafers in the production of circuit chips from the wafers, comprising

a plurality of plastic structural components adjacent each other and affixed together and arranged to define an integral one-piece rigid container to embrace and confine the wafers, said structural components being widely spaced from each other to permit more open space for access by liquid and gaseous sprays to the wafers confined, certain of said structural components having a multiplicity of teeth formed integrally therewith and projecting inwardly of the certain components to support and space the wafers, adjacent teeth of a said structural component being spaced the width of one of said wafers,

and a rigid insert completely embedded in one of said structural components and stiffening the component, said insert being formed of a material which is highly resistant to the influences of temperature in maintaining its shape and rigidity to minimize flexing or deformation of the structural components and the carrier.

15. A rigid carrier for retaining a multiplicity of thin wafers in closely spaced but continuously separated confronting relation to each other and in a stack-like arrangement to accommodate liquid and gaseous spray processing and the many high and low temperature processing steps of the wafers in the production of circuit chips from the wafers, comprising

a plurality of plastic structural components adjacent each other and affixed together and arranged to define an integral one-piece rigid container to embrace and confine the wafers, said structural components being widely spaced from each other to permit more open space for access by liquid and gaseous sprays to the wafers confined, wherein said structural components include end components and elongate side components affixed to each other, the side components traversing the edges of the wafers in the stack-like arrangement, said side components having a multiplicity of teeth formed integrally therewith and projecting inwardly of the side components to support and space the wafers, adjacent teeth of a said side component being spaced the width of one of said wafers, and the end components confronting the faces of the wafers,

and a rigid insert completely embedded in one of said structural components and stiffening the component, said insert being formed of a material which is highly resistant to the influences of temperature in maintaining its shape and rigidity to minimize flexing or deformation of the structural components and the carrier.

16. A rigid carrier for retaining a multiplicity of thin wafers in closely spaced but continuously separated confronting relation to each other and in a stack-like arrangement to accommodate liquid and gaseous spray processing and the many high and low temperature processing steps of the wafers in the production of circuit chips from the wafers, comprising

a plurality of plastic structural components adjacent each other and affixed together and arranged to define an integral one-piece rigid container to embrace and confine the wafers, said structural components being widely spaced from each other to permit more open space for access by liquid and gaseous sprays to the wafers confined, wherein said structural components include end components and elongate side components affixed to each other, the side components traversing the edges of the wafers in the stack-like arrangement, said side components each being substantially tubular and having a multiplicity of teeth formed integrally therewith projecting inwardly of the side components to support and space the wafers, adjacent teeth of a said side component being spaced the width of one of said wafers, and the end components each being generally panel shaped and including an interior chamber and the end components confronting the faces of the wafers and being affixed to the side components,

and a rigid insert completely embedded in one of said structural components and stiffening the component, said insert being formed of a material which is highly resistant to the influences of temperature in maintaining its shape and rigidity to minimize flexing or deformation of the structural components and the carrier.

4,872,555

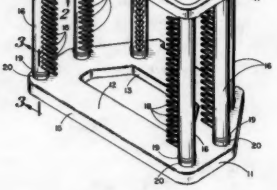
CARTON INCLUDING DETACHABLE COUPON

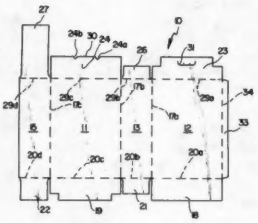
William S. Shadrach III, Atlantic Highland; Michael Mandler, Woodcliffe Lake; Ihor D. Moch, Lebanon; Bernard Zitomer, East Brunswick, and John L. Stewart II, Manalapan, all of N.J., assignors to Sunshine Biscuits, Inc., New York, N.Y.

Continuation of Ser. No. 948,171, Dec. 31, 1986, abandoned. This application Oct. 15, 1987, Ser. No. 109,386

Int. Cl.[4] B65D 5/42

U.S. Cl. 206—459 **3 Claims**





1. A carton assembled from a carton blank having a front panel, a back panel, and side panels, which blank as assembled has an opening closable by an end closure unit comprising:

(a) a major first flap hingedly connected to the front panel along a first hinge line;

(b) a second major flap hingedly connected to the back panel along a second hinge line;

(c) a minor third flap hingedly connected to one side panel along a third hinge line and extending into the top opening from said one side panel;

(d) a redeemable commercial information panel underlying the major flaps when closed and removably attaching to and extending from the other side panel into said opening a substantial distance; and

(e) means for allowing re-closing of the major flaps;

wherein said commercial information panel is removable in absence of tearing any of said first, second, and third flaps along said first, second and third hinge lines;

wherein removal of said commercial information panel is accomplished without destroying the assembled carton so as to permit subsequent re-closing of said end opening; and

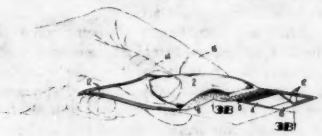
wherein said commercial information panel can be removed and presented for redemption while said carton is being used.

4,872,556

PACKAGING DEVICE WITH BURST-OPEN SEAL

Bert Farmer, 99 N. Main St., Farmington, Me. 04938

Filed Nov. 2, 1987, Ser. No. 115,352
Int. Cl.[4] B65D *47/36, 83/00*
U.S. Cl. 206—484 6 Claims



1. A package for containing and discharging fluid materials, comprising two sheets of materials sealed together about a perimeter of said sheets so as to form a container in which a fluid material may be contained, wherein a portion of a seal so formed is not capable of bursting under manual pressure and the remaining portion of said seal is capable of bursting under manual pressure applied to said container, and wherein said seal which is capable of bursting under manual pressure is formed by applying pressure to said sheets by a heated, corrugated forming means.

2. A package for containing and discharging fluid materials, comprising:

(a) a first chamber which will burst under manual pressure applied to said first chamber and a fluid material contained within said first chamber so as to discharge said fluid material; and

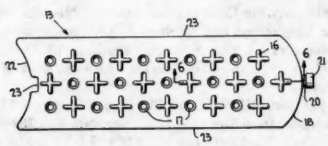
(b) a second chamber contiguous to said first chamber which will receive said fluid material as it is discharged from said first chamber and which will burst under lesser pressure applied to said second chamber, and said fluid so as to discharge said fluid from said package.

4,872,557

NESTABLE, STACKABLE CONTAINERS

Douglas A. Ames, Huntington Beach, Calif., assignor to Transphase Systems, Inc., Huntington Beach, Calif.

Filed Jan. 30, 1985, Ser. No. 696,529
Int. Cl.[4] B65D *21/02*
U.S. Cl. 206—504 11 Claims



1. A nestable, stackable container comprising a continuous container body capable of being rapidly filled with and retaining a viscous liquid therein and having top and bottom walls joined by continuous side walls extending around the periphery of the container body, said container body having a forward portion terminating in a forwardly extending mouth part to provide access to the interior of the container, and a rearward portion thereof, and comprising

(a) male or female die parts located on said top wall and adapted to cooperate with mating die parts on the botom wall of another container;

(b) male or female die parts located on said bottom wall adapted to cooperate with mating die parts on the top wall of another container;

(c) said forward portion of said container having a substantially convex curvilinear surface sloping continuously from said side walls to said mouth portion without intermediate shapes that upon rapid filling with said viscous liquid, will trap air within said container body;

(d) said rearward portion of said container being formed with a substantialy concave curvilinear surface sloping continuously from said side walls and conforming generally to the slope of the convex surface of said forwrad portion, so that a plurality of containers are stackable by mating male and female die parts on said top and bottom walls of said container, and nestable by juxtaposition of said convex and concave surfaces of a plurality of said containers, said surfaces being capable of contiguous relationship over major portions thereof whereby said convex and concave surfaces are in abutting and touching relationship so that a stack of containers will be better able to support itself.

4,872,558

BAG-IN-BAG PACKAGING SYSTEM

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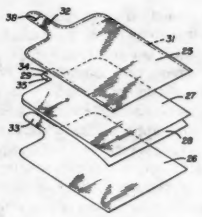
Filed Aug. 25, 1987, Ser. No. 89,228
Int. Cl.[4] B65D *81/02*
U.S. Cl. 206—522 20 Claims



1. A packaging system comprising

an outer bag defining a sealed chamber therein,

an inner bag defining a pocket adapted to retain an article therein disposed within said chamber to split said chamber into first and second chamber portions on opposite sides of said inner bag, said inner and outer bags having peripheral edges thereof secured together on all sides of said inner and outer bags to suspend said inner bag within said chamber, except for a filling stem extending outwardingly from one of said sides,

means at least substantially filling said chamber with a filler medium to substantially encapsulate and support said inner bag and article within said outer bag,

passage means for openly communicating the first and second chamber portions of said chamber with each other, and

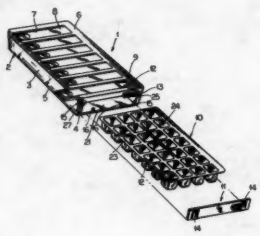
inflating means communicating with said filling stem for filling said chamber with said filler medium from an external pressurized fluid source and through said passage means,

said outer bag comprising a pair of overlying first panels having outer peripheral edges thereof sealed together to define said chamber and said inner bag comprising a pair of overlying second panels, defining peripheral edges thereof which are sealed between the outer peripheral edges of said first panels on all sides of said first and second panels, except at said filling stem, and wherein said filling stem comprises overlying stem portions secured to said first panels to define an inlet passage therebetween communicating with said chamber through said passage means, said passage means defined by overlying and folded panel portions of said second panels forming a fold line dividing said inlet passage into separate passages communicating with the first and second chamber portions of said split chamber positioned on opposite sides of said inner bag.

4,872,559
DISPENSER FOR MEDICAL PREPARATIONS

Hinrich Schoon, Tollarp, Sweden, assignor to Preci-Plast AB, Tollarp, Sweden

Continuation-in-part of Ser. No. 68,628, Jun. 30, 1987. This application May 24, 1988, Ser. No. 198,119
Claims priority, application Sweden, Dec. 29, 1987, 8705178
Int. Cl.[4] A65D *83/04*
U.S. Cl. 206—538 9 Claims

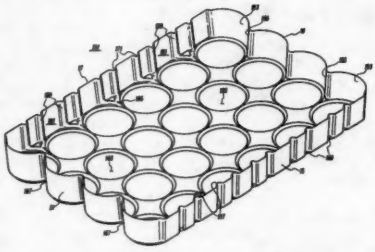


1. A dispenser for medical preparations, such as in tablet form, of the type that shall be taken at certain times of the day and over some days, such as a week, said dispenser comprising a rectangular body having two longitudinal sides, two transverse sides, a bottom and an upper surface, said upper surface having several recesses each covered by a cover which is slidable in grooves in the upper surface to be extractable in one direction, an insert having several rows of compartments, each row being positionable below a corresponding recess in the body, each compartment housing said medical preparations, and a cap closing an opening in one of the sides of the body, said cap being removable for allowing insertion and removal of said insert through said opening in said side of the body, wherein the cap at each end thereof comprises a shoulder and wherein said one side of the body comprises two edges adapted for retaining the cap in a closed position and the cap being elastic for being pressed inward at one side so that the corresponding shoulder can pass inside the edge and the cap can be pushed in the transverse direction for bending the cap and making the other shoulder at the other end of the cap free from the corresponding other edge of the body for removal of the cap.

4,872,560
TRAY FOR STORING AND TRANSPORTING BEVERAGE CONTAINERS AND THE LIKE

Keith A. Langenbeck, 4005 University Blvd., Dallas, Tex. 75205

Continuation-in-part of Ser. No. 30,899, Mar. 26, 1987. This application Jul. 22, 1987, Ser. No. 76,295
Int. Cl.[4] B65D *1/34*
U.S. Cl. 206—557 10 Claims



1. A tray for storing and transporting a plurality of cylindrically-shaped articles in a substantially upright position, said tray comprising:

a bottom member, a pair of oppositely positioned first and second side walls extending longitudinally along said tray and a pair of oppositely positioned first and second end walls extending transversely across said tray, said bottom member and said walls being interconnected to define an enclosure for receiving said articles;

each of said first and second end walls being comprised of a first plurality of recessed regions separated by corresponding ones of a plurality of inwardly extending surfaces to provide a substantially scalloped appearance on said end walls, the end wall surface within each region being curved to conform to the curved surface of the corresponding article so that substantially the entire curved surface of the portion of the article which is disposed within the recessed region is in contact with the end wall surface within each region;

said first and second side walls having respective first and second sets of rib members extending vertically along sustantially the entire height of the respective side walls and partially inwardly across said bottom member on respective inner surfaces thereof, selected ones of said first and second sets of rib members being arranged in cooperating pairs to define a second plurality of recessed regions therebetween;

the respective outer surfaces of said first and second side walls and said bottom member being substantially smooth to enhance the structural integrity of the tray;

said bottom member having a plurality of receptacles disposed therein for receiving predetermined lower portions of corresponding ones of said articles when said articles are disposed within said tray in a substantially upright position, each of said receptacles having a substantially circular shape to conform to the cylindrical shape of said articles, a portion of said bottom member surrounding each of said receptacles being beveled to substantially conform to the chine portion of the corresponding article received within the receptacle.

4,872,561
CARBOXY, CARBOALKOXY AND CARBAMILE SUBSTITUTED ISONITRILE RADIONUCLIDE COMPLEXES

Alun G. Jones, Newton Centre; Alan Davison, Needham; James Kronauge, Cambridge, and Michael J. Abrams, Allston, all of Mass., assignors to Massachusetts Institute of Technology and President and Fellows of Harvard College, both of Cambridge, Mass.

Division of Ser. No. 771,284, Aug. 30, 1985, Pat. No. 4,735,793. This application Dec. 29, 1987, Ser. No. 139,289
Int. Cl.[4] B65D *69/00*; C07C *119/02*; C07F *13/00*; A61K *49/02*
U.S. Cl. 206—569 10 Claims

7. A kit for converting a supply of a radionuclide to a coordination complex of a lower alkyl isonitrile ligand of the formula:

$$CN—X—R,$$

where X is a lower alkyl group having 1 to 4 carbon atoms, wherein R is selected from the group consisting of $COOR^1$ and $CONR^2R^3$ where R^1 can be H, a pharmaceutically acceptable cation, or a substituted or unsubstituted alkyl group having 1 to 4 carbon atoms, R^2, and R^3 can be H, or a substituted or unsubstituted alkyl group having 1 to 4 carbon atoms, and R^2 and R^3 can be the same or different, and a radioactive metal selected from the class consisting of radioactive isotopes of Tc, Ru, Co, Pt and Re, said kit comprising a predetermined amount of said lower isonitrile ligand and a supply of a reducing agent capable of reducing the radionuclide, wherein said isonitrile ligand and said reducing agent are sterile and non-pyrogenic.

4,872,562

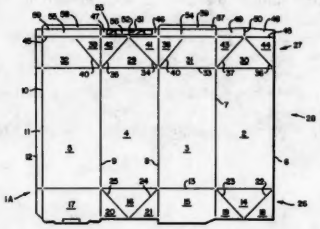
GABLE-TOP CONTAINER

Gregory R. Wyberg, Minneapolis, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 36,908, Apr. 10, 1987, Pat. No. 4,762,234. This application Mar. 9, 1988, Ser. No. 160,403

Int. Cl.[4] B65D 5/06

U.S. Cl. 206—631.3 9 Claims



1. A sheet material blank for constructing a sealed gable-top container having inner and outer surfaces responsible to a container sealing process, said blank comprising:

(a) a container body having sides, a bottom, and a top;

(b) an extensible pouring spout including first and second substantially triangular end panels connected to said container body top, first and second foldback panels, said first foldback panel connected to one lateral edge of said first triangular end panel, and said second foldback panel connected to another lateral edge of said first triangular end panel, a first roof wing panel adjoining said first foldback panel and connected thereto, a second roof wing panel adjoining said second foldback panel and connected thereto, third and fourth foldback panels, said third foldback panel connected to a first roof panel and to one lateral edge of said second triangular end panel, and said fourth foldback panel connected to another lateral edge of said second triangular end panel and adapted to be connected to a second roof panel, first and second gable rib panels connected to upper edges of said first and second foldback panels, respectively, to extend upwardly therefrom, having upper edges and lateral edges, and connected to each other at a common line, third and fourth gable rib panels connected to upper edges of said third and fourth foldback panels, respectively, and to each other, first and second roof rib panels connected to the upper edges of said first and second roof panels, respectively, each of said roof rib panel connected at one side thereof to one of said first and second gable rib panels, first and second upper rib panels connected to upper edges of said first and second roof rib panels, respectively, and

(c) at least one stiffening fillet overlying a portion of, and bonded to an outer surface of at least one of said pouring spout panels, for stiffening said at least one said panel to transfer applied opening forces along said at least one said panel to open said container, said fillet comprising (x) a strip of material constructed of unoriented polypropylene resistant to the container sealing process and having a modulus of elasticity of at least 0.1×10^6 psi, and (xx) a layer of adhesive attached to one side of said strip and to said outer surface of said at least one side panel for bonding said strip thereto.

4,872,563

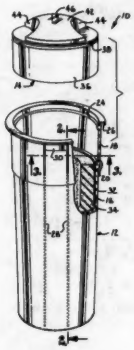
PROTECTIVE ENCLOSURE FOR HAZARDOUS MATERIAL PRIMARY CONTAINERS

William G. Warder, Weston, Mo., and David R. Frye, Longview, Tex., assignors to Pro-Tech-Tube, Inc., Weston, Mo.

Filed May 31, 1988, Ser. No. 200,568

Int. Cl.[4] B65D 17/00

U.S. Cl. 206—634 9 Claims



7. A protective device for packaging a container holding hazardous materials such as those containing viable microorganisms, said device comprising:

an enclosure having a bottom and a side wall which presents a top section of the enclosure having a size to receive and hold said container therein;

a top for said enclosure, said top being separate from the enclosure and having a size and shape to be inserted into said top section to close the enclosure and enclose the container therein;

means for locking said top in said top section to impede removal of the top therefrom;

a line of weakness on said side wall; and

means for providing a tab on the side wall in proximity of said line of weakness, said tab being accessible for pulling to break the side wall along said line of weakness in a manner to effect release of said locking means and allow removal of the top to provide access to the container.

4,872,564

METHOD OF, AND APPARATUS FOR, AUTOMATICALLY CHECKING EGGS FOR FLAWS AND BLEMISHES, SUCH AS CRACKS, BLOOD, DIRT, A LEAK, ABERRANT FORM AND THE LIKE

Jelle van der Schoot, Aalten, Netherlands, assignor to Staalkat B.V., Netherlands

Filed Jun. 7, 1988, Ser. No. 203,102

Claims priority, application Netherlands, Jun. 30, 1987, 8701531

Int. Cl.[4] A01K 43/00; B07C 5/02, 5/342

U.S. Cl. 209—511 4 Claims

3. In an apparatus for inspecting eggs for flaws or blemishes having a conveyor roller track for conveying eggs with adjacent conveyor rollers thereof adapted to receive a single egg, a light source disposed adjacent the conveyor roller track, a light detector for generating information as to which eggs have flaws or blemishes and storage means for storing said information in a tracking memory for subsequently discarding flawed or blemished eggs, the improvement comprising an auxiliary roller track having a plurality of auxiliary rollers, means for temporarily interdisposing an auxiliary roller between said adjacent conveyor rollers such that the egg supported thereby is temporarily supported by a first of said conveyor rollers and

the interdisposed auxiliary roller and lifted off of the second of the adjacent conveyor rollers, means for causing the interdisposed auxiliary roller to rotate at a greater peripheral speed

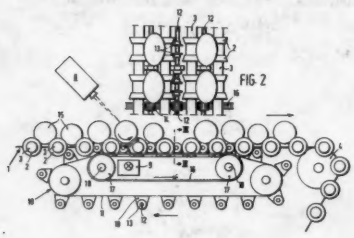


FIG. 2

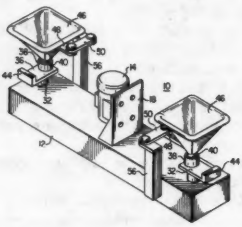
than that of the first of said conveyor rollers to impart such rotation to the egg so as to increase the speed of inspection thereof by said detector as the said rotating egg passes thereby.

4,872,565

APPARATUS AND METHOD FOR CLEARING DEBRIS FROM CUT TREES

Don J. McAlpine, R.R. 2, Medinpolis, Iowa 52637

Filed Feb. 12, 1988, Ser. No. 155,547
Int. Cl.[4] B07C 9/00
U.S. Cl. 209—699 **13 Claims**



1. A tree shaker comprising:
(a) a base;
(b) a vertical shaft journalled for rotation with respect to the base;
(c) horizontal turntable means carried by the shaft;
(d) means for rotating the shaft; and
(e) a receptacle shaped for receiving the cut end of a tree trunk, mounted on the turntable for relative rotation with respect to the turntable, and horizontally offset from the shaft.

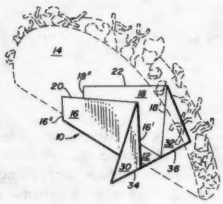
4,872,566

TACO SHELL HOLDER

Richard E. Alsup, 2104 Loma Vista Pl., Los Angeles, Calif. 90039

Filed May 20, 1988, Ser. No. 196,445
Int. Cl.[4] A47F 7/00
U.S. Cl. 211—13 **3 Claims**

1. In a taco shell holder for holding a taco shell during the filling thereof and during consumption, said taco shell holder comprising:
a bottom horizontal support surface upon which rests a lower surface of a taco shell, said bottom support surface comprising a first and a second parallel longitudinal edge, a forward edge and a rearward edge;
a first and second upstanding side wall, said first side wall having a lower edge integral with said first longitudinal edge of said bottom support surface and projecting upwardly therefrom, and said second side wall also having a lower edge integral with said second longitudinal edge of said bottom support surface and projecting upwardly therefrom:
each of said first and second side walls having an upstanding forward edge surface substantially adjacent said forward edge of said bottom support surface, each said side wall further comprising an upper edge surface sloping downwardly from said forward edge rearwardly, whereby the vertical distance of each said upper edge above said bottom support surface continuously diminishes from front toward rear; a first and a second triangular brace wall, said first brace wall having an upstanding edge integral with the entire height of the forward edge surface of said first side wall, and said second brace wall having an upstanding edge integral with the entire height of the forward edge surface of said second side wall, said first brace wall lying in a plane extending at an angle with respect to a plane containing therein said first side wall, and said second brace wall lying in a plane extending at an angle with respect to a plane containing therein said second side wall,



whereby said brace walls serve to hold the holder erect in self-supporting manner, so that a taco shell is held therein during the filling process without the need of support by a hand;
each said side wall extending along the entire length of said bottom support surface and being trapezoidal in shape and also comprising a rear edge surface parallel to said forward edge surface, said rear edge surface having a height less than said forward edge surface, said rear and forward edge surfaces defining the bases of said trapezoidal shape, each said first and second side wall extending upwardly from the respective said longitudinal edge of said bottom surface and diverging away from each other, each said side wall lying in a plane forming an acute angle with respect to a vertical plane containing therein a respective said longitudinal edge of said bottom support surface, said acute angle being between ten and thirty degrees;
each said upper edge surface of each said side wall sloping downwardly at an angle of between fifteen and forty degrees;
each said brace wall extending from said upstanding forward edge of a respective said side wall.

4,872,567

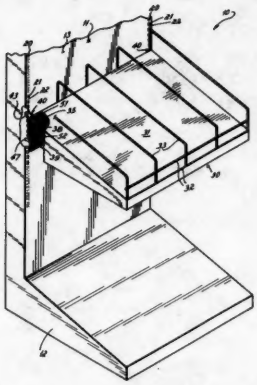
SHELF CONVERSION UNIT FOR GONDOLA DISPLAY

Rafael T. Bustos, Alpharetta, Ga., assignor to Leggett & Platt, Incorporated, Carthage, Mo.

Continuation of Ser. No. 866,776, May 23, 1986, abandoned.
This application Oct. 20, 1987, Ser. No. 110,380
Int. Cl.[4] A47F 7/00
U.S. Cl. 211—59.2 **9 Claims**

1. The method of converting the shelf of any one of a plurality of differing gondola displays to a fixed size and configuration replacement shelf of a different type and wherein each of the gondola displays has a base and at least two horizontally spaced vertical uprights fixed to and extending upwardly from said base, each of said uprights of each of said plurality of gondola displays having a plurality of vertically spaced verti-

cal slots therein, the corresponding slots of different ones of said uprights being horizontally aligned for supporting a shelf, and said differing gondola displays being characterized by a different combination of spacing of said uprights, of the dimensions of said slots, of the shape of said slots, and of the spacing of said slots in said uprights, each of said gondola displays being further characterized by having at least one shelf supported from said at least two vertical uprights and cantilevered over said base from said at least two vertical uprights, which method comprises



removing said one shelf from said at least two vertical uprights,

mounting a supporting bracket on each upright of said one gondola display by engaging a rearwardly facing hook of each bracket with one of the corresponding slots of said uprights, and

mounting said fixed size and configuration of replacement shelf on said brackets by engaging a hook of one of said brackets or said replacement shelf with a slotted opening in the other of said brackets or said replacement shelf.

4,872,568

COAT HANGER SUSPENDING DEVICE

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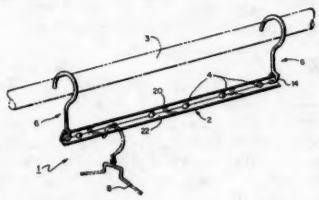
Continuation-in-part of Ser. No. 33,019, Mar. 31, 1987, abandoned. This application Aug. 8, 1988, Ser. No. 231,589

Int. Cl.[4] A47G *25/02*

U.S. Cl. 211—113 **4 Claims**



1. A coat hanger supporting device comprising:

an elongated unitary rod member having a uniform, generally channel-shaped cross section consisting of two sides forming on angle therebetween and further having a first end and a second end, said rod member defining a plurality of oblong openings therethrough in the area where the two sides come together to form the angle, said openings being spaced along the length thereof;

a first rigid open hook member freely and flexibly connected to said first end of said rod member, such that a universal swivel between said first hook and said rod member is formed;

a second rigid open hook member freely and flexibly connected to said rod member, such that a universal swivel is formed therebetween, and first and second hook member being sized and shaped to facilitate attachment and removal of the device from supporting means of various shapes and sizes to which at least one of said first or second hook members may be so engaged, said universal swivel providing a free and flexible connection such that said hook members may form a full range of angles relative to said rod member in any direction when said hook is attached to said supporting means.

4,872,569

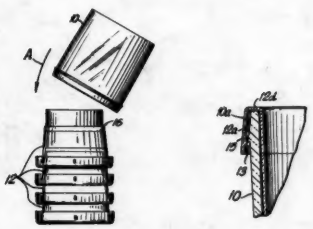
DRINKING VESSELS

Brown Bolte, 630 N. Federal Hwy., North Palm Beach, Fla. 33408

Continuation of Ser. No. 655,063, Sep. 26, 1984, abandoned, which is a continuation-in-part of Ser. No. 575,546, Jan. 31, 1984, abandoned, which is a continuation-in-part of Ser. No. 470,844, Feb. 28, 1983, abandoned. This application May 12, 1987, Ser. No. 52,167

Int. Cl.[4] B65D *23/06*

U.S. Cl. 215—12.1 **50 Claims**



1. A drinking vessel adapted to provide an exterior surface portion substantially free of condensation, comprising:

a first vessel member having an open top and being adapted to receive and contain any desired substance such as a liquid to be consumed;

a second vessel member associated with but generally separated from said first vessel member to form a thermal air space therebetween,

said first vessel member comprising a removable insert member proportioned to conform generally to the configuration of said second vessel member, said insert member being receivable within said second vessel member to form a generally double-walled drinking vessel having said thermal air space between said insert member and said second vessel member, said insert member also including a lip along its open top, said lip extending towards the bottom of said insert member and being proportioned to substantially prevent a person's lip from contacting said second vessel member during use, and said insert member being tapered to a greater degree from its open top to its bottom than said second vessel member and further including grasping means associated between said insert member and said second vessel member for permitting releasable engagement between said insert member and said second vessel member,

said second vessel member being adapted to provide a barrier against formation of condensation on its exterior holding surface and to form a thermal air space between said insert and second vessel members to provide a ther-

mally insulative gap to help maintain the termperature of any substance contained within said insert member, said second vesel member including vent means for communicating said thermal air space with the ambient surroundings of said drinking vessel to permit thermal expansion and contraction of air within said thermal air space due to the presence of hot or cold substance within said insert member, and said second vessel member further including drip means associated with said vent means for substantially preventing moisture within said thermal air space from spilling through said vent means when said drinking vessel is tilted during use, such that a person can hold said drinking vessel along the exterior holding surface of said second vessel member substantially without contacting any condensation and without any condensation leaking out of said drinking vessel, any condensation forming on said insert member tending to collect within said thermal air space while the exterior surface of said second vessel member remains substantially free of condensation, and, further such that when said second vessel member is thrust down onto a stack of said insert members and thereafter lifted, one said insert member is grasped by said second vessel member yet can be removed therefrom when desired with relative ease for replacement by another said insert member.

4,872,570

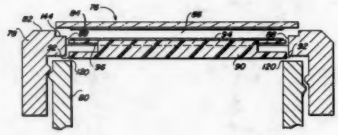
TAMPER INDICATOR

Claude J. Harding, 3520 E. Cannon Dr., Phoenix, Ariz. 85028

Continuation-in-part of Ser. No. 119,389, Oct. 10, 1987, Pat. No. 4,804,096. This application Nov. 16, 1988, Ser. No. 271,647

Int. Cl.[4] B65D *55/02*

U.S. Cl. 215—230 **17 Claims**



1. A tamper indicator comprising:

a. a first cylindrical element having an upper wall and a first cylindrical chamber with a side wall oriented generally parallel to a first plane;

b. a second cylindrical element with a side wall oriented generally parallel to the first plane and telescopically interconnected with the first cylindrical element and including an upper surface, the second cylindrical element being rotationally displaceable between first, second and third angular positions within a second plane orthogonal to the first plane and telescopically displaceable between a compressed position and an expanded position;

c. indicator means including

i. a first indicator element coupled to the upper wall of the first cylindrical element;

ii. a second indicator element coupled to the upper surface of the second cylindrical element and being rotationally displaceable with the second cylindrical element, the indicator means displaying a first status when the second cylindrical element is positioned in the second angular position and displaying a second status when the second cylindrical element is positioned in the third angular position;

d. means for biasing the first and second cylindrical elements into the expanded position and for rotationally biasing the first and second cylindrical elements toward the third angular position; and

e. locking means for maintaining the first and second cylindrical elements in the first angular position when the first and second cylindrical elements are placed in the expanded position, for enabling the biasing means to displace the first and second cylindrical elements into the second angular position when the first and second cylindrical elements are displaced from the expanded position into the compressed position, and for enabling the biasing means to displace the first and second cylindrical elements into the third angular position when the first and second cylindrical elements are displaced from the compressed position into the expanded position, whereby the indicator means display changes from the first status into the second status when the first and second cylindrical elements are displaced from the second angular position into the third angular position.

4,872,571

CONTAINER POUR SPOUT WITH PEELABLE TAMPER-PROOF SEAL

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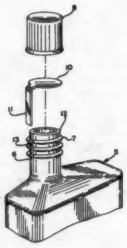
Filed Jan. 23, 1989, Ser. No. 299,780

Int. Cl.[4] B65D *41/62*

U.S. Cl. 215—232 **2 Claims**



1. In a container comprising a pour spout through which flowable contents may be poured, said spout having exterior threads, an internally threaded cap screwed onto said spout, and a membrane-like closure secured by a seal over the circumferential lip of said spout, the improvement which comprises, said membrane-like closure having an elongated pull tab by means which said membrane-like closure can be peeled off said lip, and said external threads on said spout being interrupted in a direction parallel to the axis of said spout so as to provide in said external threads a groove in which said tab may reside when said cap is screwed on said spout.

4,872,572

LYOPHILIZATION STOPPER (CASE II)

Rik Schrooten, Kleine Brogel, Belgium, assignor to Helvoet Pharma N.V., Alken, Belgium

Filed Dec. 23, 1988, Ser. No. 288,972

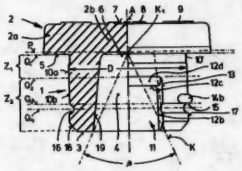
Claims priority, application Fed. Rep. of Germany, Dec. 24, 1987, 3744174

Int. Cl.[4] B65D *51/16*

U.S. Cl. 215—307 **7 Claims**

1. Lyophilization stopper made of a rubber elastic material and composed of a shank intended for insertion into the container neck to be sealed and of an essentially circular disc shaped flange which is made in one piece with the shank and projects radially beyond it, with the longitudinal axis of the flange being congruent with the longitudinal axis of the shank; the shank includes a cavity which surrounds the longitudinal axis of the shank, is open toward the free end face of the shank and extends up to a centrally closed wall portion of the flange; over its axial length, the shank includes a first section which extends between a first transverse plane defined by the boundary face of the flange projecting radially outwardly from the

shank and a second transverse plane perpendicular to the longitudinal axis of the shank; this first section has a closed outer circumferential face whose maximum diameter is slightly larger than the inner diameter of the container neck; following the first section, the shank has a second section having an outer enveloping face which has essentially the same diameter as the first section and includes at least one passage communicating with a cavity extending from the end face of the shank to a radial opening disposed in the second section adjacent the second transverse plane; a plurality of blocking elements, which can be pushed back by elastic deformation, project outwardly from the second section beyond the enveloping face, with their axially outer boundaries lying on a common



third transverse plane perpendicular to the longitudinal axis of the shank and disposed between the second transverse plane and the free end face of the shank perpendicularly to the longitudinal axis of the shank, characterized in that

the inner wall face (19) laterally defining the cavity (4) lies entirely outside a cone (K) whose axis is the longitudinal axis (A) of the shank, whose tip (K_1) lies in the first transverse plane (Q_1) and whose tip angle (β), in degrees, is larger than a value calculated according to the formula

$$-39+75\times\lg(D),$$

where "lg" in the formula represents the decimal logarithm and "D" the maximum diameter (D), measured in millimeters, of the first section (Z_1) of the shank (1).

4,872,573

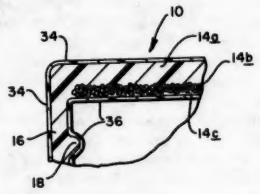
PLASTIC CLOSURE WITH BARRIER COATING

Marion Johnson, Baytown, and Granville J. Hahn, Big Spring, both of Tex., assignors to Permian Research Corporation, Big Spring, Tex.

Continuation-in-part of Ser. No. 922,127, Oct. 23, 1986, Pat. No. 4,744,478. This application May 17, 1988, Ser. No. 195,095

Int. Cl.[4] B65D *53/00*

U.S. Cl. 215—347 **11 Claims**



1. A polymeric container closure molded from a single moldable polymeric composition, said closure comprising integrally molded polymeric end and side walls, said end wall further comprising a first layer having a density substantially the same as the density of said side wall and a second relatively less dense foamed layer that is formed in situ, said molded closure being further adapted to retard the migration of oxygen-containing gasses through said closure by the addition of at least one dissimilar polymeric barrier layer.

4,872,574

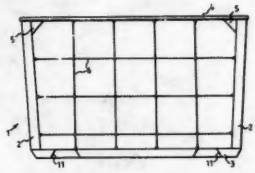
CONTAINER

David C. S. Lam, 23 Hong San Walk, Singapore, Singapore 2368

Filed Nov. 17, 1987, Ser. No. 121,717

Int. Cl.[4] B65D *7/00*

U.S. Cl. 220—1.5 **12 Claims**



1. A container having a square or rectangular frusto-pyramid shape and a base, whereby empty containers can be stacked one inside another, wherein said container comprises uprights at each corner thereof, a rim connecting the upper ends of said uprights, a base linked to the lower ends of said uprights, open sides which are traversed by a mesh, gussets positioned between said uprights, said base, and/or said rim for strengthening said container, and means in said base for receiving forks of a forklift truck.

4,872,575

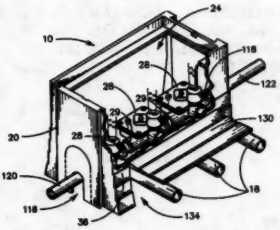
PROTECTIVE HOUSING STRUCTURE FOR UNDERGROUND DEVICES

Errol D. Kobilan, 13030 Meridian Rd., Elbert, Colo. 80106

Filed Jun. 30, 1987, Ser. No. 68,115

Int. Cl.[4] H02G *3/08*

U.S. Cl. 220—3.3 **22 Claims**



1. A protective housing structure adapted to house and protect devices mounted beneath ground level and connectable to underground interconnect elements such as conduit and the like, comprising a base assembly constructed as an upstanding wall forming an enclosure with an interior adapted to house at least one of said devices, said base assembly having a bottom edge defining an open bottom and a top edge defining an open top and having first and second end wall portions oppositely disposed with respect to one another, and cooperative interlocking means associated with each of said first and second end wall portions for securing two protective housings together in end-to-end relation with an end wall portion of one of said housings facing an end wall portion of the other of said housings each of said first and second end wall portions including a portion of reduced wall thickness contiguous with said bottom edge to provide areas each of which may be cut in a selected shape and the cut portion removed to form a slot through which an interconnect element may longitudinally extend to be connected to said device therein.

4,872,576

SOFT-METAL MADE CAN BODY WITH SQUASHING GUIDES

Tadashi Nakamura, 346, Futago, Takatsu-ku, Kawasaki-shi, Kanagawa-ken, Japan

Filed Mar. 2, 1988, Ser. No. 163,244
Claims priority, application Japan, Jul. 17, 1987, 62-109027
Int. Cl.[4] B65D *1/40*
U.S. Cl. 220—83 **1 Claim**

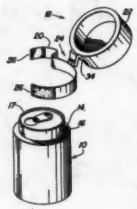
1. A beverage can formed of soft-metal having a smooth, cylindrically shaped outer peripheral surface, a top surface and a bottom surface and spiral pressure-squashing guides printed on said smooth outer peripheral surface of said can body in such a way as not to distort said smooth outer peripheral surface, and extending between said top and bottom surface,-said outer peripheral surface of said can-body being adapted to be manually pressed by fingers along said spiral pressure-squashing guides thereby deforming said can body and said can body being further adapted to be crushed by squeezing said top and bottom surfaces together while simultaneously twisting said deformed can body.

4,872,577

HINGED CLOSURE ATTACHMENT FOR INSULATED BEVERAGE CAN CONTAINER

Jimmy L. Smith, R.R. 3, Geneso, Ill. 61254

Filed Dec. 23, 1988, Ser. No. 289,135
Int. Cl.[4] B65D *43/14*
U.S. Cl. 220—85 CH **1 Claim**



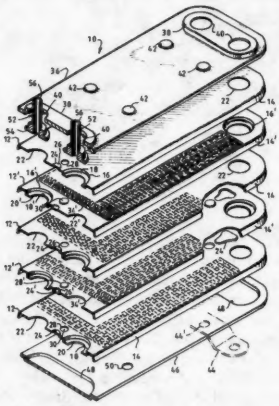
1. A closure attachment for an insulated container having an annular wall terminating in an upper marginal edge providing an open top for receiving a beverage can wherein the height of the wall is less that that of the can whereby an upper cylindrical portion of the received can is exposed above the aforesaid marginal edge, said attachment comprising annular band means configured to tightly encircled the insulated container wall below the aforesaid marginal edge and independently of the beverage can, an imperforate lid dimensioned to fit over the open top of the insulated container, said lid being in the form of an insulated inverted cup configured to overlie the top of the insulated container wherein closed position and additionally to snugly fit over the enclose the exposed upper portion of the beverage can, and hinge means connecting the lid to the band means.

4,872,578

PLATE TYPE HEAT EXCHANGER

Raymond F. Fuerschbach, Tonawanda; Timothy P. Creighton, Buffalo, and David F. Fijas, Depew, all of N.Y., assignors to ITT Standard of ITT Corporation, Buffalo, N.Y.

Filed Jun. 20, 1988, Ser. No. 209,228
Int. Cl.[4] F28F *3/08*
U.S. Cl. 165—167 **23 Claims**



1. A plate type heat exchanger comprising:

a plurality of first heat exchange plates arranged in stacked relation, each of said first heat exchange plates including a first heat transfer section, a peripheral flange extending downwardly from said first heat transfer section, a first depression extending downwardly from said first heat transfer section and including a first flow opening extending therethrough, a second flow opening defined within said first heat transfer section, a first projection extending upwardly from said first heat transfer section, and a second depression extending downwardly from said first heat transfer section;

a plurality of second heat exchange plates arranged in alternating, stacked relation with said first heat exchange plates, each of said second heat exchange plates including a second heat transfer section, a peripheral flange extending downwardly from said second heat transfer section and including a first flow opening extending therethrough, a second flow opening defined within said second heat transfer section, a first projection extending upwardly from said second heat transfer section, and a second depression extending downwardly from said second heat transfer section;

said first flow opening of at least one of said first heat exchange plates adjoining said second flow opening of at least one of said second heat exchange plates;

said second depression of said at least one of said first heat exchange plates adjoining said first projection of said at least one of said second heat exchange plates;

a bottom plate mounted in stacked relation to one of said first or second heat exchange plates, said bottom plate including a plurality of downwardly extending depressions; and

support feet mounted to said bottom plate, said support feet including a plurality of openings therein, said depressions from said bottom plate extending within said support feet openings.

4,872,579

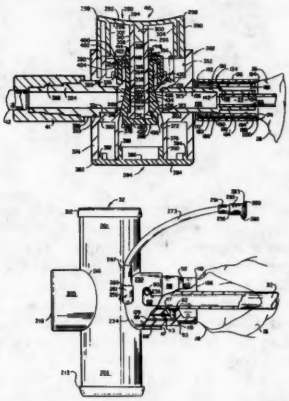
ASPIRATING/VENTILATING APPARATUS AND METHOD

Darrel Palmer, Sandy, Utah, assignor to Ballard Medical Products, Midvale, Utah

Division of Ser. No. 49,376, May 14, 1987, Pat. No. 4,836,199, which is a division of Ser. No. 916,341, Oct. 7, 1986, Pat. No. 4,696,296, which is a division of Ser. No. 767,400, Aug. 20, 1985, Pat. No. 4,638,539, which is a division of Ser. No. 633,570, Jul. 23, 1984, Pat. No. 4,569,344. This application Apr. 11, 1988, Ser. No. 179,800

Int. Cl.[4] A62B *9/02*

U.S. Cl. 128—205.19 **7 Claims**



1. A non-contaminating normally closed valve assembly for use in selectively delivering vacuum to a desired site, the valve assembly comprising valve means and valve body means in which the valve means may be manually displaced, the valve body means comprising bore means and means for isolating the vacuum pressure from the atmosphere, the valve means comprising a single structural element normally simultaneously self-biasing and sealing the valve means to the valve body means in a closed position at the bore means, but accommodating on-going manual displacement of the single structural element counter to the self-bias into an open position for opening said bore means across the valve assembly to the vacuum pressure.

4,872,580

CARPET SAMPLE HOLDER

Robert T. Fuller, 1351 Empire St., Anaheim, Calif. 92804, and Robert J. Sanders, 2200 E. Oshkosh Cir., Anaheim, Calif. 92806

Continuation of Ser. No. 74,583, Jul. 17, 1987, abandoned. This application Feb. 1, 1989, Ser. No. 304,916

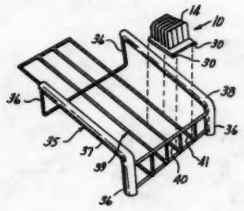
Int. Cl.[4] A47F *7/16*

U.S. Cl. 211—45 **2 Claims**

1. A carpet sample display device comprising:

a stand including a grid which has a pair of parallel rods: and

a rack having a base with a generally flat upper surface and a lower surface, said surfaces having a substantial dimension of width, a plurality of parallel, spaced apart blades attached to and extending away from said upper surface at an oblique angle relative thereto, each of said blades having a substantial dimension of width and of length, each pair of adjacent blades forming a clear slot between them which is open at the sides and free ends of said blades, the face of each blade which is intended to bear against the pile of a carpet sample placed in the respective slot being smooth so as not to form a pattern on that carpet sample, and a plurality of hook-like members on and projecting below said lower surface adapted releasably to engage to



a respective said rod, there being at least one said hook-like member for each rod of said pair of rods.

4,872,581

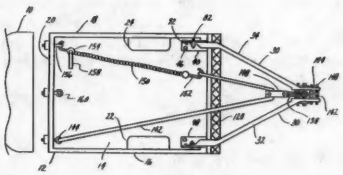
KNOCK-DOWN BOOM FOR PICK-UP TRUCK

Norman G. Wedhorn, 44112 Yost, Canton, Mich. 48188

Filed Nov. 20, 1987, Ser. No. 123,334

Int. Cl.[4] B66C *23/44*

U.S. Cl. 212—180 **5 Claims**



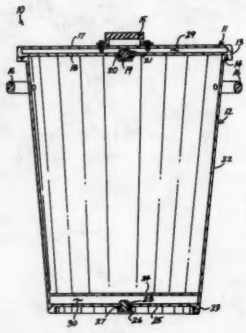
1. In association with a truck having a longitudinal centerline; said truck including a cargo box defined by a bed, a forward wall, two side walls, and a tailgate: the improvement comprising a V-shaped boom structure; means pivotally mounting said boom structure for vertical swinging movement around an axis that is transverse to the cargo box side walls in close adjacency to the rear end of the bed and lower edge of the tailgate; said boom structure having a length that is less than the distance between the pivot means and forward wall of the cargo box, whereby the boom structure can be swung forward to a storage position totally disposed within the cargo box; said boom structure comprising two convergent bars having two closely-spaced ends in near proximity to the vehicle centerline and two widely-spaced ends in near proximity to the cargo box side walls; means rigidly connecting the closely-spaced ends of said bars; said rigid connecting means comprising a plate (**104** or **106**) welded to an end of each bar in parallelism to the vehicle centerline, at least two transverse tubular spacers (**110, 114**) extending from one plate to the other plate, and threaded fastener means (**116, 120**) extending through the tubular spacers to rigidly but detachably connect the convergent bars; said pivot means comprising two widely-spaced foot structures detachably fastened to the bed in near adjacency to the cargo box side walls for connection to the widely-spaced ends of the convergent bars; the space between the convergent bars being unobstructed, whereby cargo can be placed therein when the boom is in its storage position.

4,872,582

WEIGHTED REFUSE CONTAINER

Gene L. Sipple, 3207 N. Rankin St., Appleton, Wis. 54911

Filed May 19, 1988, Ser. No. 196,053
Int. Cl.[4] B65D *90/00*
U.S. Cl. 220—1 T 1 Claim



1. A refuse container comprising a receptacle means and a lid means for overlying securement to said receptacle means:

said receptacle means including a tapered continuous wall and floor with said wall terminating at a lower edge with a flange positioned below said floor, said floor defining a continuous web orthogonally and integrally joined to said wall, and

a first floor disposed above said floor defining a second continuous web orthogonally and integrally joined to said wall, and

said floor and said first floor defining a sealed water-tight receptacle chamber therebetween, and

a removable plug means replaceably and sealingly securable to an opening in said floor for receiving fluid in said receptacle chamber, and

said lid means includes a roof portion defining a lid roof web continuously and integrally joined to a downwardly depending flange wherein said flange is of a length and orientation terminating in a continuous downwardly depending edge for securement to an upper terminal end of said wall of said receptacle, and

wherein said lid further includes a lid floor defining a lid floor web spaced below said lid roof web and above the lower continuous edge of said flange to define a lid chamber between said lid rood web and said lid floor web, and said lid floor web formed with a centrally positioned opening and a further plug removably and sealingly securable to said opening, and

wherein said lid chamber is of a volume to receive a predetermined quantity of fluid, and said receptacle chamber is of a volume to receive a further quantity of fluid to exceed said predetermined quantity of fluid, and

said continuous wall of said receptacle is downwardly tapering from an upper radially outwardly projecting rim for cooperation with said flange of said lid to said flange positioned below said floor, and

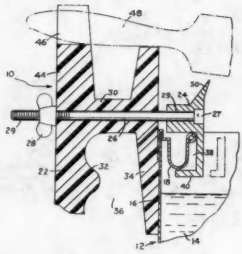
wherein said plug in said floor sand said further plug in said lid are threadedly securable within complementary threaded openings respectively in said receptacle and said lid, and said openings are axially aligned.

4,872,583

HANDLE STRUCTURE FOR PAINT CONTAINER

Zdenek Zelenka, and Lyn Zelenka, both of #66-9633-180 St., Edmonton, Alberta, Canada T5T 4G4

Filed May 26, 1988, Ser. No. 199,051
Int. Cl.[4] B65D *25/28*
U.S. Cl. 220—94 R 1 Claim



1. In association with an open-topped container for liquid coating material, said container having an annular side wall that terminates in an inwardly radiating rim structure circumscribing a central opening for withdrawal of the contained liquid material;

the improvement comprising a handle structure to facilitate manipulation of the container during brush application of the coating material onto an uncoated surface; said handle structure comprising a handle component, a separate clamping component, and a threaded connector means operable to draw the clamping component toward the handle component;

said handle component being a one piece molded plastic member that includes a horizontal bridge section (**30**), a downwardly-depending pistol hand grip section (**22**) at one end of said bridge section, and a downwardly-depending container-engagement section (**34**) at the other end of said bridge section; said container-engagement section being horizontally spaced from the hand grip section so that an intervening space is formed for the user's fingers that extend around the hand grip section, said horizontal bridge section having a horizontal circular hole extending completely therethrough in the zone above the hand grip section and container-engagement section;

said clamping component comprising a three dimensional body (**24**) having a C-cross section when viewed in a vertical plane coincident with the horizontal hole in the handle component; said C-cross sectioned body including a vertically thickened upper section having an undersurface adapted to seat on the upper surface of the container rim structure, a downwardly-extending web section depending from said vertically thickened section for disposition within the container, and a horizontal flange (**40**) extending from the lower end of said web section so that it can underlie the container rim structure;

said threaded connector means comprising an elongated horizontal bolt (**29**) fixedly and permanently attached to said clamping component; said bolt having a non-circular head (**27**) located in a non-circular socket in the upper section of the clamping component body, and a threaded shank extending horizontally through the upper section of the clamping component body so that said shank is spaced above the undersurface of said upper section when the clamping is operatively seated on the container rim structure; said elongated bolt being adapted to have its shank extend completely through the horizontal hole in the bridge section of the handle component body; and a wing nut (**28**) threadable onto a threaded end of said bolt, to thereby draw the bolt and attached clamping component

toward the bridge section of the handle component; said clamping component being horizontally spaced from the handle component whereby coating material adhering to the clamping component will have difficulty in reaching the interface between the bolt and handle component.

4,872,584

SAFETY DEVICE FOR A RADIATOR CAP

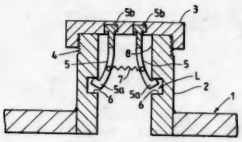
Takashi Sakai, Saitama, Japan, assignor to Akebono Brake Industry Co., Ltd., Tokyo, Japan and Akebono Research and Development Centre Ltd., Saitama, Japan

Filed Jul. 27, 1988, Ser. No. 226,337

Claims priority, application Japan, Aug. 28, 1987, 62-130177[U]

Int. Cl.[4] B65D *55/00*

U.S. Cl. 220—201 **6 Claims**



1. A safety device for a radiator cap detachably mounted on a fluid supply opening having an inner surface of a radiator for sealing the fluid supply opening, comprising:

a lock means for preventing the radiator cap from being detached from the fluid supply opening when the temperature of coolant located in said radiator is higher than a predetermined temperature value, said lock means being provided between said radiator cap and said inner surface of said fluid supply opening, said lock means being provided in pairs formed of two individual lock means and each of said individual lock means of said pair being spaced a distance from one another;

said lock means including a lock portion provided on said inner surface of the fluid supply opening and a lock member having two ends, one of said two ends of said lock member fixedly secured to the radiator cap and the other of said two ends of said lock member extending downwardly from the radiator cap into the fluid supply opening, said lock member being formed of a shape memory alloy.

4,872,585

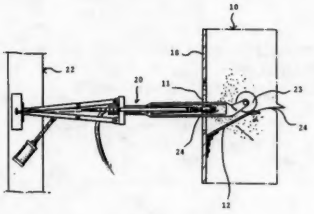
TRASH CONTAINER TO BE CHEMICAL SPRAYED

Il Yoo Kim, 7953 Audubon Ave., B-7, Alexandria, Va. 22306

Filed Oct. 14, 1988, Ser. No. 257,882

Int. Cl.[4] B65D *43/14*

U.S. Cl. 220—334 **2 Claims**



1. A trash container adapted to be chemical-sprayed internally which comprises:

a trash container having a top which can be opened,

an aperture disposed in one of the side walls of said trash container,

a door mounted by a hinge to close said aperture, said door biasing mounted to the interior of said side wall to open into said trash container, said door containing:

a bent lip end portion disposed opposite from said hinge, said bent lip end portion being inclined toward the inside of said trash container at a slope of 15°–20° for providing a smooth rolling surface for guiding a guide roller which supports an extensible chemical spray apparatus, said extensible chemical spray apparatus being slidably inserted against the bias of the door through the aperture and slidably removed from the trash container through said door, and

handle means disposed on opposite sides of the trash container, whereby the door is provided to accommodate the extensible chemical spray apparatus and the handle means are provided to accommodate a pair of lifting arms mounted to the dump truck so that the trash container can be simultaneously emptied and disinfected in a single operation.

4,872,586

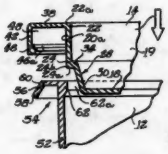
CONTAINER CLOSURE AND ASSEMBLY

H. Richard Landis, Oak Lawn, Ill., assignor to Landis Plastics, Inc., Chicago, Ill.

Filed Sep. 25, 1987, Ser. No. 101,039

Int. Cl.[4] B65D *39/00*

U.S. Cl. 220—307 **11 Claims**



1. An injection molded plastic closure having non-uniform wall thickness for application to a container having a container sidewall and a container rim, said closure comprising:

a top central circular panel for covering an open container,

a plug-like portion extending upwardly from the central circular panel and for insertion into the open mouth of the container for sealing engagement with the container side wall,

an encircling rim on the closure extending radially outwardly from the plug-like portion and having an outer depending skirt,

an enlarged bead of a cross-sectional thickness substantially greater than the cross-sectional thickness of said skirt and said top central panel for locking engagement with the container rim,

said plug-like portion having a substantially vertical upper wall portion and a lower wall portion offset radially inwardly from the vertical upper wall portion,

a lateral offset portion interconnecting the upper vertical wall portion and the offset lower wall portion,

a lower nesting surface on the bottom side of the lateral offset portion,

and an upper nesting surface on the top of the vertical upper wall portion for engagement,

said lower nesting surface engaging the upper nesting surface of another closure stacked therebelow and the upper surface on said closure engaging a lower nesting surface of a closure thereabove to stack the vertical upper wall portions in a vertical column.

4,872,587

CLOSURE FOR A FUEL TANK

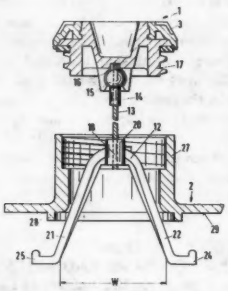
Günther Zimmermann; Reinhard Friedrich, both of Waiblingen; Wolfgang Nantt, Steinheim, and Wolfgang Weissert, Leutenbach, all of Fed. Rep. of Germany, assignors to Andreas Stihl, Waiblingen, Fed. Rep. of Germany

Filed Jul. 7, 1988, Ser. No. 216,203

Claims priority, application Fed. Rep. of Germany, Jul. 24, 1987, 8710127[U]

Int. Cl.[4] B65D 55/16

U.S. Cl. 220—375 18 Claims



1. A closure for a tank such as the fuel tank of a handheld portable tool such as a motor-driven chain saw, the closure comprising:

a filling stub defining a longitudinal axis and being formed on the tank and defining an opening having a sealing surface about the periphery thereof;

a cap for coacting with said sealing surface to close the tank in a seal-tight manner, said cap including an upper grip portion for manually gripping and rotating the cap to remove the same from said filling stub, the cap also having a lower portion extending downwardly from said grip portion for projecting into said filling stub when said cap is placed on said opening;

a completely limp non-metal connecting member for connecting said cap with the tank, said connecting member defining an axis and having first and second ends;

holding means for preventing said connecting member and said cap from being separated from the tank after the cap has been removed from said opening;

said connecting member being made of fuel resistant plastic so as not to scratch said sealing surface during the time that said cap is removed from said opening thereby protecting said sealing surface from damage which could affect the integrity thereof;

attachment means for loosely attaching said connecting member at said second end thereof to said lower portion of said cap;

said attachment means including a spherically shaped recess formed in said lower portion; a ball attached to said first end of said connecting member and being journalled in said recess with play so as to permit free movement of said ball in said recess in the manner of a socket joint while at the same time being fixed with respect to movement along said axis;

said tank having a tank wall defining an inner wall surface in the vicinity of said filling stub; and,

said holding means including a V-shaped resilient hook attached to said second end of said connecting member, said resilient hook having two legs defining the V-shape thereof, each of said legs having an offset end segment which comes into contact arresting engagement with said inner wall when the cap is removed from the opening of said inlet stub thereby preventing said cap and said connecting member from becoming completely detached from the tank when the cap is removed from said inlet stub.

4,872,588

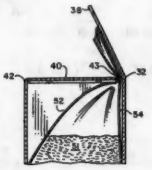
LINED CARTON

Teodoro A. Texidor, 6720 N. Navajo, Lincolnwood, Ill. 60646

Continuation of Ser. No. 876,688, Jun. 20, 1986. This application Dec. 18, 1987, Ser. No. 135,499

Int. Cl.[4] B65D 5/56

U.S. Cl. 220—403 10 Claims



1. In a reclosable lined carton having first and second side walls, first and second end walls, a closed bottom and an open top defined by the upper marginal edges of said walls, and a liner including opposed sheets forming a receptacle having a closed bottom and an open top for storing a commodity within the carton, the improvement comprising:

an inner closure flap hingedly secured to said first side wall along the upper marginal edge thereof and movable between open and closed positions,

an outer closure flap hingedly secured to said second side wall along the upper marginal edge thereof and flap overlying a portion of said inner closure flap when said closure flaps are in their closed positions,

the length of the liner from top to bottom being greater than the length of said side walls from top to bottom, defining a liner upper portion which extends between said closure flaps when said closure flaps are in the open position,

and means bonding said liner upper portion to a portion of the inner surface of said outer closure flap whereby, as said outer closure flap is moved between its open and closed positions, said liner upper portion is moved with said outer closure flap, said inner closure flap conforming in length and width to the length and width of the cross-section of the carton whereby when said inner closure flap is moved to its closed position, its outer marginal edge is located at the junction of said second side wall and said outer closure flap with said outer marginal edge fitting tightly into the dihedral angle formed by said second side and said outer closure flap, pinching the liner therebetween along the entire length of the junction of said second side and said outer closure flap, and upon subsequent movement of said outer closure flap to its closed position, said liner upper portion of the liner is located between the outer surface of said inner closure flap and the inner surface of said outer closure flap, providing a substantially air-tight seal for the liner.

4,872,589

LINER/INSERT FOR REFRIGERATED CONTAINER

John D. Englehart, 44 S. State St., Vineland, N.J. 08360, and William H. Seaburn, 5417 Duncanwood Dr., Sarasota, Fla. 34232

Filed Apr. 18, 1988, Ser. No. 182,338

Int. Cl.[4] B65D 90/04

U.S. Cl. 220—410 8 Claims

1. An improved device for the refrigerated storage of materials, which comprises:

a top-opening refrigerated container having a bottom and side walls that define an interior volume;

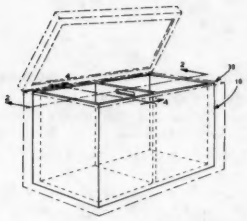
a liner having a base and walls dimensioned to be releasably

received within said interior volume of said container, said walls being contiguous with said side walls of said container, said base and walls of said liner defining an interior volume of said liner and an opening into said liner;

partition means for dividing said liner into at least two compartments, said partition means being a thin wall extending between opposite walls of said liner and perpendicularly from said base of said liner toward said opening of said liner and having a top edge proximate said opening, said partition means segregating said interior volume of said liner into a plurality of compartments having watertight integrity with respect to each other; and

handle means defined by said partition means for selectively removing and inserting said liner from and into said container.

8. A combination liner/insert for segregating a preselected top-opening ice chest into two watertight compartments and for protecting the interior of said ice chest against damage caused by substances or articles placed therein comprising:



a liner, said liner having a base and walls comprised of relatively thin molded plastic dimensioned to substantially define the interior dimensions of said ice chest for being closely received therein, said walls further defining an opening substantially conforming to the opening of said ice chest;

partition means integrally molded within said container, said partition means comprising a wall of approximately the same thickness as said liner walls and being substantially vertically disposed extending from the base of said liner toward said opening of said liner, perpendicular to said base and said opening of said container, thereby segregating said container into two watertight compartments, said partition means having a top edge portion proximate said opening of said liner; and

handle means comprising said partition means having a hole located proximate its said top edge portion, said hole being dimensioned to receive the fingers of a human hand.

4,872,590

RESIN COATED CAN WITH FOLDED SEAM

Hitoshi Sasaki, and Shoji Igota, both of Kawasaki, Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Continuation of Ser. No. 736,969, May 22, 1985, abandoned, which is a continuation-in-part of Ser. No. 531,994, Sep. 14, 1983, abandoned. This application Aug. 5, 1986, Ser. No. 892,465

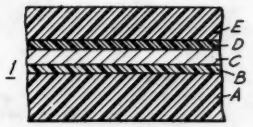
Claims priority, application Japan, Dec. 3, 1982, 57-212519; Dec. 3, 1982, 57-212520; Dec. 3, 1982, 57-212521; May 22, 1983, 58-89861

The portion of the term of this patent subsequent to Feb. 10, 2004, has been disclaimed.

Int. Cl.[4] B65D *25/14, 8/08*

U.S. Cl. 220—457 **3 Claims**

1. A retortable structure comprising a cylindrical body and a resin layer formed on the outside thereof, said cylindrical body serving as a content protecting layer which is formed by spirally wrapping a lmainate film composed of a polyolefin layer, a gas barrier layer, and a plastic layer around a mandrel, with one side edge thereof folded back and outward and the folded part bonded such that air bubbles are not entrapped thereunder, simultaneously superimposing the other side edge of the laminate film on the folded part and bonding them together such that air bubbles are not entrapped between them, said resin layer having sufficient thickness and strength such that said resin layer alone rigidifies the body to be self supporting, said resin layer being formed by melt extrusion onto the outside of said cylindrical body, with said cylindrical body cooled with water passing through the gap between the cylindrical body being formed and the mandrel, said resin layer being surface-finished by a smoothing means after melt extrusion and thereby lacking seams or bends.



4,872,591

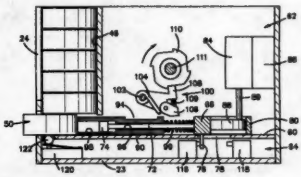
MEDICATION DISPENSER

Richard O. Konopka, 5695 Janet Blvd., Solon, Ohio 44139

Filed Nov. 19, 1987, Ser. No. 122,794

Int. Cl.[4] B65D *83/04*

U.S. Cl. 221—3 **19 Claims**



1. A medication dispenser, comprising:

a plurality of cannisters within which medicine to be dispensed can be placed;

a portable housing having a top wall and a front wall;

a plurality of vertically oriented magazines disposed within the housing, the magazines adapted to receive cannisters stacked atop each other, the magazines having upper and lower ends, each magazine having an entrance opening adjacent its upper end through which cannisters can be inserted into the magazine and a discharge opening adjacent its lower end through which the lowermost cannister can be ejected from the magazine;

discharge means disposed within the housing for pushing individual cannisters through the discharge openings of selected magazines, the discharge means being movable between a cannister-ejecting position and a retracted position, the discharge means including a horizontally movable block disposed adjacent each magazine, the block being engageable with the lowermost cannister in the magazine, a horizontally movable feed slide disposed adjacent the blocks, a drive motor for moving the feed slide, a lost motion connection between the feed slide and the blocks, and means for preventing the blocks from moving except at predetermined times; and

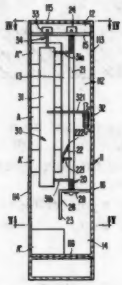
control means disposed within the housing for activating the discharge means at selected times.

4,872,592

ARTICLE STORAGE AND DISPENSING DEVICE WITH SOLD OUT INDICATING MECHANISM

Anazawa Osamu, Maebashi, Japan, assignor to Sanden Corporation, Gunma, Japan

Continuation of Ser. No. 11,256, Feb. 5, 1987, abandoned. This application Aug. 3, 1988, Ser. No. 228,837
Claims priority, application Japan, Feb. 5, 1986, 61-14450[U]
Int. Cl.[4] G07F *11/00*
U.S. Cl. 221—6 2 Claims



1. An article storage and dispensing device comprising:
a cabinet;
article supporting and dispensing means for contiguously supporting said articles in a vertical stack and for individually dispensing said articles;
article aligning and detecting means for aligning said articles and for detecting when all of said articles have been dispensed, said article aligning and detecting means comprising a detecting plate substantially spanning the entire height of said stack of articles and an arm extending from said detecting plate, said detecting plate engaging said articles to align said articles in said stack;
mounting means for pivotably mounting said article aligning and detecting means in said cabinet, said aligning and detecting means pivotable about a vertical pivot axis offset relative thereto to allow pivotal movement of said aligning and detecting means in a direction toward and from said stack of articles;
biasing means for biasing said aligning and detecting means toward said stack of articles; and
sold-out indicator switch means for indicating a sold-out condition of said device, said arm disposed adjacent said indicator switch means, said detecting plate pivoting about said pivot axis when all of said articles from said stack have been dispensed, said sold-out indicator switch means engaged and actuated by said arm upon pivotal movement of said detecting plate to indicate a sold-out condition of said device.

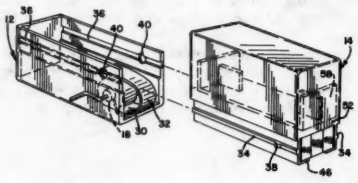
4,872,593

DISPENSER FOR PACKAGED BANDAGES AND THE LIKE

John W. Behringer, 143 Main St., North Kingstown, R.I. 02852

Filed Jan. 11, 1988, Ser. No. 142,832
Int. Cl.[4] B65H *1/08*
U.S. Cl. 221—231 11 Claims

1. An apparatus for storage and dispensing of flat package units comprising:
a base;
engagement means rotatably mounted within said base;
said engagement means comprising a substantially cylindrical roller truncated parallel to its axis, said roller having a follower extending from said roller;
a cartridge slideably mounted to said base, said cartridge defining a chamber therewithin for the storage of flat package units;
said cartridge having a horizontal track slideably engageable with a horizontal channel in said base and said track having a lug which engages a socket in said channel when said cartridge is in proper horizontal relationship with said base allowing for the proper dispensing of said flat package units;
said chamber having a floor with a longitudinally disposed elongated slot defined therein alignable with said engagement means;



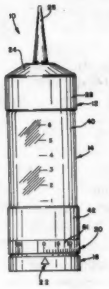
means for biasing toward said floor a plurality of flat package units stacked on said floor;
means associated with said base for rotatably driving said engagement means; and
an exit portal defined in said cartridge adjacent to one end of said chamber floor,
whereby rotation of said engagement means causes said engagement means to frictionally engage a lowermost package unit from said plurality in said chamber through said slot only when the cylindrical portion of said roller is in direct contact with the follower and to urge said package unit toward and through said portal.

4,872,594

HAIR COLORING APPLICATOR BOTTLE

Robert Bloom, 425 Ascot La., Streamwood, Ill. 60103

Filed Sep. 12, 1988, Ser. No. 243,592
Int. Cl.[4] B67D *5/06*
U.S. Cl. 222—173 9 Claims



1. A hair coloring applicator bottle comprising:
liquid receptacle means for receiving and containing hair coloring liquids therein;
an applicator spout removably secured to a discharge end of said receptacle means;
a base rotatably arranged at an opposite end of said receptacle means for normally maintaining said receptacle means in a vertical orientation;
a timer mechanism operably interconnecting said liquid receptacle means and said base;

time period indicia on one of said receptacle means and said base;

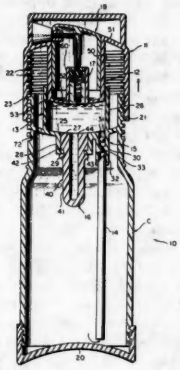
timer pointer indicia on the other said receptacle means and said base whereby said receptacle means and said base can be relatively rotated to selectively position the time period indicia relative to said timer pointer indicia to set the timer mechanism.

4,872,595

MECHANICALLY PRESSURIZED AEROSOL DISPENSER

Roy Hammett, 16103 Carden Dr., Odessa, Fla. 33556; Jerry D. Hutcheson, 8188 S. Harrison Way, Littleton, Colo. 80122, and Raymond B. Avedon, 2821 N. Lakeridge Trail, Boulder, Colo. 80302

Filed Sep. 27, 1988, Ser. No. 249,956
Int. Cl.[4] B65D *37/00, 88/54;* B67D *5/42*
U.S. Cl. 222—209 10 Claims



1. A mechanically pressurized dispensing device comprising:

a container having an open, top end and a closed, bottom end;

rotatable actuator means engaged with one end of the container and connected with a first expansible chamber means to enlarge the volume of the chamber to draw product to be dispensed from the container and into the chamber when the actuator means is rotated in a first direction and then to reduce the volume of the chamber to pressurize the product when the actuator means is rotated in a second direction;

a second expansible chamber means connected to receive pressurized product from the first expansible chamber means when the actuator means is rotated in said second direction and to store the product under pressure for dispensing; and

a discharge valve connected with the second expansible chamber means to release the pressurized product therefrom for dispensing the product;

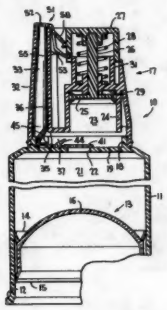
said first expansible chamber means including a piston and cylinder, one of the piston and cylinder being formed integrally with said container and the other of said piston and cylinder being formed integrally with said actuator.

4,872,596

VISCOUS PRODUCT DISPENSER

Douglas F. Corsette, Los Angeles, Calif., assignor to Calmar Inc., Watchung, N.J.

Filed Mar. 15, 1988, Ser. No. 168,248
Int. Cl.[4] B67D *5/42*
U.S. Cl. 222—380 5 Claims



1. A viscous product dispenser having a storage compartment and a coaxial pump chamber, a transversely extending separator wall between said compartment and said chamber and having an inlet port therein, a spring biased pump actuator operable within said pump chamber for dispensing the product from a transversely offset, longitudinally extending product discharge spout defining a discharge passage, a transversely extending passage parallel to said separator wall interconnecting said pump chamber with said discharge passage, an outlet port in a wall of said spout and at an end of said transverse passage opening into said discharge passage, a valve element on said separator wall, said valve element having an integral inlet flap valve preventing backflow of product into said compartment through said inlet port, and having an integral outlet valve preventing backflow of product into said chamber through said outlet opening, the improvement comprising:

said valve element having a flat base overlying and parallel to said separator wall and being perpendicular to said discharge passage, said outlet valve being integral with said base, and said inlet valve lying initially parallel to said base;

said element having integral means operating between said outlet valve and said base, and generally perpendicular to said base, for spring biasing said outlet valve into a discharge closing position; and

said outlet valve bearing solely against said spout wall in said discharge closing position.

4,872,597

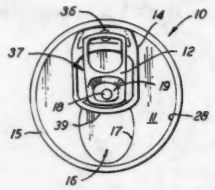
BEVERAGE CONTAINER WITH DUAL DISPENSING TABS

Hisao Hanafusa, 20 Confucius Plaza - #34-F, New York, N.Y. 10002

Filed Oct. 13, 1988, Ser. No. 257,484
Int. Cl.[4] B65D *47/10*
U.S. Cl. 222—541 15 Claims

1. A beverage container for soda or beer beverage, comprising a tubular member for storing and dispensing said beverage, said tubular member having a removable sealed lid, a first pull tab for unsealing and tearing said lid from said tubular member,

means defining a sealed aperture upon said lid, and a second pull tab secured to said lid for unsealing said aperture, and



wherein said first and second pull tabs are interleaved with respect to one another.

4,872,598

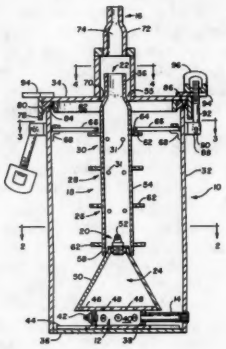
DUSTING APPARATUS

Tonny D. Travis, 113½ Laurel Ter., Beckley, W. Va. 25801

Filed May 10, 1988, Ser. No. 192,769

Int. Cl.[4] B05B 7/00

U.S. Cl. 222—630 **13 Claims**



1. Apparatus for dispersing dust material into the atmosphere at low concentration levels and substantially uniform rates, comprising tank means adapted for holding substantial quantities of solid, particulate dust material, fluidizer means positioned in a lower portion of said tank means, air feed means communicating with said fluidizer means, discharge port means in an upper portion of said tank means communicating with the ambient atmosphere, tubular densifier means mounted substantially vertically in said tank means and extending from a lower portion thereof to adjacent said discharge port means, said densifier means having air inlet means adjacent its lower end and outlet means adjacent its upper end in direct and immediate communication with said discharge port means, air feed means communicating with said inlet means, said densifier means having a series of longitudinally spaced apertures in the wall thereof providing for the substantially non-pressurized transfer of solid dust material from said tank means into said densifier means for transportion to said discharge port means and into the ambient atmosphere.

4,872,599

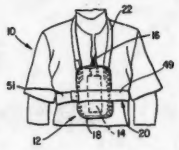
TELEMETRY POUCH WITH EXPANSIBLE CHEST STRAP

Vance M. Hubbard, Bedford, and Welton K. Brunson, Tarrant County, both of Tex., assignors to Tecnol, Inc., Fort Worth, Tex.

Continuation-in-part of Ser. No. 576,961, Feb. 3, 1984, which is a continuation of Ser. No. 354,632, Mar. 4, 1982, abandoned. This application Apr. 12, 1985, Ser. No. 722,323

Int. Cl.[4] A45F 3/14

U.S. Cl. 224—208 **1 Claim**



1. A pouch for maintaining hospital telemetry apparatus adjacent a patient while being sufficiently low cost in construction and materials as to be economically disposable after use, comprising:

an open-topped bag formed from opposed sidewalls fabricated from 1.2 ounce non-apertured polyester material joined at the side and bottom edges thereof by heat sealing with ultrasound such that a flexible moisture proof exterior is formed that is dimensioned to receive the telemetry apparatus and allow the telemetry apparatus to protrude therefrom and which prevents perspiration or liquid damage to the apparatus during use;

an inner layer disposed adjacent the innermost side of at least one of the said opposed sidewalls and ultrasonically bonded thereto, and fabricated from 0.035 inch polyester foam material to provide a high friction causing layer, said inner layer preventing substantial movement of the telemetry apparatus within said bag such that forces on the telemetry apparatus directed outward from the opening in said bag do not result in separation of said bag and the telemetry apparatus, the flexibility of said bag enhancing the friction applied by said inner layer;

said opposing sides joined together in such a manner that the interior of said bag opens outwardly from the open top thereof to the bottom thereof in such a manner that objects within the pouch are restricted from removal;

a first strap having first and second ends and being dimensioned to fit around the body of the patient, said first strap being heat sealed with ultrasound at said first end to one of said side edges of said bag, said first strap having an inner side and an outer side, substantially the entire inner side is fabricated from non-apertured polyester material and said outer side manufactured from a knitted fabric having the surface thereof brushed to raise individual fibers into a pile thereby forming a multiplicity of uninterrupted arches of unbroken individual filaments, and a section of elastic material spliced by heat sealing with ultrasound into said first strap;

hooking material attached to the side edge of said bag opposite said first end of said strap for hooking with said outer side first strap such that said bag is secured to the body of said patient when said first strap is disposed about the body of said patient and attached to the hooking member;

a second strap having first and second ends dimensioned to fit around an upper portion of the body of the patient, said second strap being heat sealed with ultrasound at said first end to an upper corner of said bag, said second strap having an inner side and outer side, said inner side fabricated from non-apertured polyester material and the entire said outer side fabricated from knitted fabric having the surface thereof brushed to raise individual fibers into a

pile composed of a multiplicity of uninterrupted arches of unbroken individual filaments;

a hooking layer attached to the upper corner of said bag opposite said first end of said second strap for mating with the outer side of said second strap such that said bag is maintained at a desired height relative to the body of the patient; and

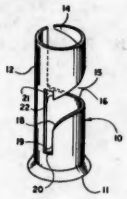
said first and second straps adjustably securing said bag to body of said patient and said foam inner layer in said bag preventing dislodging of the telemetry apparatus contained therein for all directions of motion of said patient, whereby said pouch is completely constructed with ultrasound techniques to increase the speed and reduce the cost of manufacture thereof.

4,872,600

SPEED SQUARE INTERLOCKING HOLDER

Douglas L. Corbin, P.O. Box 40, Seabrook, S.C. 29940

Filed May 4, 1988, Ser. No. 190,253
Int. Cl.[4] A45F *5/00*
U.S. Cl. 224—245 **4 Claims**



1. A tool holder, for carrying a tool having an aperture therein on a person's belt or the like, said tool holder comprising a generally cylindrical body having a top and bottom edge, a tool holding slot defined in said cylindrical body for receiving the tool to be held, said tool holding slot extending parallel to the centerline of said cylindrical body and defining a locking shoulder on at least one side of said slot for preventing lateral movement of said tool to be held, and a means for selectively receiving a belt of a user for carrying said tool holder on a person, such that said cylindrical body would be oriented in a generally vertical direction with respect to the user so that said tool holding slot would extends generally, said cylindrical body further defining a cam slot extending from said tool holding slot at an intermediate portion thereof to the top edge of said body, the intersection of said cam slot with said tool holding slot defining said locking shoulder, a tang formed from the wall of said body between said cam slot and top edge and extending circumferentially thereof, the lower edge of said tang comprising the upper edge of to said cam slot, the lower edge of said cam slot comprising a cam surface extending downwardly and circumferentially of said cylindrical body, the arrangement being such that said tang is receivable through said aperture of said tool to be held and said tool rests on said cam surface, said can surface being downwardly sloped such that said tool to be held is movable by gravity along said cam surface towards said tool holding slot.

4,872,601

TWO LARGE ROLL TOILET TISSUE DISPENSER

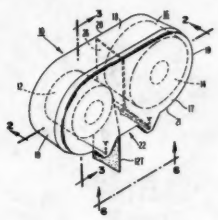
Jerry A. Sigmund, Bala Cynwyd, Pa., assignor to Scott Paper Company, Philadelphia, Pa.

Filed Sep. 4, 1987, Ser. No. 93,344
Int. Cl.[4] B65H *35/10*
U.S. Cl. 225—38 **11 Claims**

1. A two roll toilet tissue dispenser comprising:

(a) means in the dispenser for rotatably supporting the two rolls with the axis of each roll perpendicular to a mounting wall of the dispenser;

(b) a dispensing opening centrally located at the bottom of the dispenser and at least in part formed by two walls extending down from the bottom of the dispenser, each wall being located nearer to the center axis of one roll and its respective tail fixing surface than the other downwardly extending wall, and, the wall terminating in a tensioning edge parallel to the axes of the rolls, and



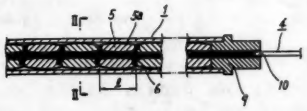
(c) means mounted in the dispenser having a surface for fixing the location in the dispensing opening of the tail of at least one of said roll of tissue when the radius of the roll is less than the perpendicular distance from the vertical plane passing through the centerline of said roll to its respective tail fixing surface and wherein the perpendicular distance from the vertical plane passing through the centerline of a roll to the nearest tensioning edge is less than the perpendicular distance from said plane to the nearest roll tail fixing surface.

4,872,602

GUIDE DEVICE FOR THE DRIVE TAPE OF AN AUTOMATIC SEAT BELT SYSTEM

Takada Juichiro, 12-1 Shinmachi 3-chome, Setagaya-ku, Tokyo, Japan

Filed Feb. 23, 1988, Ser. No. 159,313
Claims priority, application Japan, Feb. 23, 1987, 62-039675
Int. Cl.[4] B65H *23/04*
U.S. Cl. 226—196 **4 Claims**



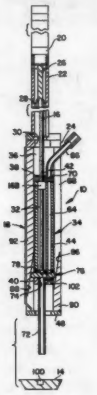
1. In a drive device for a vehicle automatic seat belt system in which a drive tape is slidably received within a cylindrical casing, the improvement wherein buckling-prevention members are received freely between the tape and the wall of the casing, said members being a multiplicity of unitary barrel-shaped bodies disposed in end-to-end engagement along the length of the tape and on opposite sides of the tape, said bodies having holes that are disposed lengthwise of the tape and shaped to constrain the tape to move along the axis of the casing and that slidably receive the tape, and said bodies being axially coextensive with the tape and casing and being displaceable about the axis of the casing to facilitate tape twisting and being engageable at least at intervals with the tape and the casing so as to maintain the axis of the tape substantially aligned with the axis of the casing so that the tape does not buckle.

4,872,603

INSERT INSTALLATION MACHINE

Ralph A. Stearns, Bozrah, Conn., assignor to Spirol International Corporation, Killingly, Conn.

Filed Sep. 16, 1988, Ser. No. 245,753
Int. Cl.[4] H05K *13/04*
U.S. Cl. 227—97 **20 Claims**



1. A machine for installing an insert into a workpiece and comprising a frame, a quill for applying an insert driving force to drive the insert into the workpiece, the quill being mounted on the frame for reciprocation toward and away from the workpiece between a retracted starting position and a fully extended position, an insert guide tube supported on the frame in coaxial alignment with the quill for reciprocating movement between a retracted ready position and an extended operating position, and a shuttle having an aperture, the shuttle being supported on the frame for movement between an insert loading position, wherein the aperture is displaced in offset relation to the quill for receiving the insert, and an insert installing position, wherein the aperture is coaxially aligned with both the quill and the insert guide tube, the quill being engageable in positive driving relation to the shuttle upon movement of the quill toward the workpiece to move the shuttle from its insert loading position to its insert installing position and simultaneously therewith to move the insert guide tube from its retracted ready position to its extended operating position.

4,872,604

HEATED TOOL WITH STOP MECHANISM

Gero Zimmer, Munich, Fed. Rep. of Germany, assignor to Productech Reflow Solder Equipment Inc., Rolling Hills Estate, Calif.

Filed Jul. 6, 1988, Ser. No. 215,626
Claims priority, application Fed. Rep. of Germany, Jul. 9, 1987, 3722726
Int. Cl.[4] B23K *3/00*
U.S. Cl. 228—9 **13 Claims**

1. An apparatus for connecting one part to another by heating the parts, comprising:

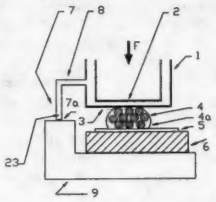
a heated tool having a heating bar with a heating surface for contacting one of the parts;

means for moving the tool into contact with the one part and in a direction toward the other part;

stop means for stopping the movement of the tool at a selected spacing from the other part;

said stop means comprising a mechanical stop connected to said tool and having a lower end for engagement with the other part or with a support for supporting the other part; and

said heated tool comprising at least one holder bar connected to one end of said heating bar for applying pressure and current to said heating bar, said mechanical stop



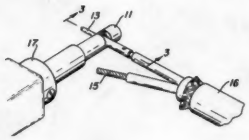
extending in substantial alignment with said holder bar and beyond said heating surface.

4,872,605

ROLL-OFF SOLDER TIP

Kenneth S. Rinko, 518 Crown St., Morrisville, Pa. 19067

Filed Nov. 16, 1987, Ser. No. 121,419
Int. Cl.[4] H01R *43/02;* **B23K** *3/02*
U.S. Cl. 228—51 **4 Claims**



1. A soldering iron tip, comprising:

a. a substantially cylindrical elongate main body,

b. a slot located within said main body, said slot being oriented transverse and perpendicular to the axis of said cylindrical main body, and

c. a reduced width at one end of said slot creating a step and a shoulder within said slot parallel to said axis of said main body.

4,872,606

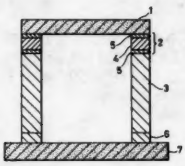
SEALED STRUCTURE AND PRODUCTION METHOD THEREOF

Motohiro Satoh; Toshihiro Yamada; Akiomi Kohono; Akihiko Yamamoto; Keiji Taguchi, all of Ibaraki; Takahiro Daikoku, Ushiku, and Fumiuki Kobayashi, Sagamihara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 10, 1986, Ser. No. 940,490
Claims priority, application Japan, Dec. 11, 1985, 60-276784
Int. Cl.[4] B23K *1/03*
U.S. Cl. 228—121 **16 Claims**

1. In a method of producing a sealed structure consisting of ceramic members opposing each other and a frame bonded with said ceramic members and forming an He-tight chamber with said ceramic members, the improvement comprising the steps of: inserting a high melting point insert member consisting of a core member made of pure aluminum or an aluminum alloy and skin members made of an aluminum alloy having a lower melting point than that of said core member, between one of said ceramic members and one side of said frame; heating said one ceramic member, said insert member and said frame in a vacuum to melt only said skin members to effect

diffusion bonding; and solder-bonding the other of said ceramic members and the other side of said frame by a soldering material having a lower melting point than said high melting point insert member.



4,872,607

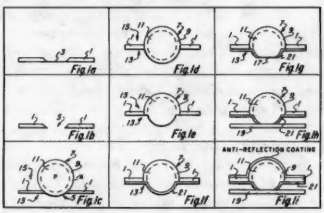
METHOD OF BONDING SEMICONDUCTOR MATERIAL TO AN ALUMINUM FOIL

Millard J. Jensen, Balch Springs, and Jules D. Levine, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 154,503, Feb. 4, 1988, abandoned, which is a continuation of Ser. No. 647,601, Sep. 4, 1984, abandoned. This application Sep. 26, 1988, Ser. No. 250,982

Int. Cl.[4] H01L *31/18*

U.S. Cl. 228—180.1 **20 Claims**



1. A method of bonding a semiconductor material to an aluminum foil, comprising the steps of:

(a) providing an aluminum foil having discrete spaced apertures therein,

(b) placing spherically shaped semiconductor material adjacent said apertures,

(c) heating said foil and said material in the range of from about 500° C. to about 577° C., and

(d) moving said material into said apertures under force shearingly to move said material whereby native oxides on the surface of said foil are sheared to expose the underlying aluminum for bonding.

4,872,608

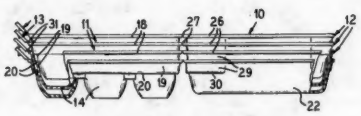
18 CELL EGG CARTON WITH ANGLED LATCH FLAP

Connie Lake, Tinley Park, Ill., assignor to S. Eisenberg & Co., Division of Creative Industries, Inc., Bridgeview, Ill.

Filed Apr. 7, 1988, Ser. No. 178,653

Int. Cl.[4] B65D *85/32*

U.S. Cl. 229—2.5 EC **16 Claims**



1. A molded one-piece cellular carton adapted to be manufactured in an opened position from thermoplastic sheet material and used on standard packaging machinery which comprises an open top tray with a planar peripheral rim providing front, back and end walls and having a plurality of open top individual cells within the confines of said rim, a dished cover for closing said tray integrally hinged to the tray rim along the backwall thereof, said cover having peripheral sidewalls bottoming on the rim of the tray in the closed position of the carton, said front planar rim wall of the tray having an upwardly and outwardly inclined latching flap along the length thereof terminating inwardly from the rim end walls and joined to the tray through an integral hinge line accommodating inward swinging of the flap against spring bias from its free state outwardly inclined position to an inwardly inclined position behind the front peripheral wall of the cover, the free state outwardly inclined position of the latching flap defining an obtuse angle with the tray rim of about 120 to 140 degrees.

4,872,609

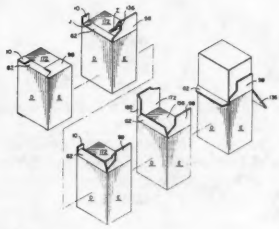
CARTON AND BLANK FOR PACKAGING ICE CREAN OR THE LIKE

Richard E. DePaul, West Chester, Pa., assignor to Somerville Packaging Corporation, Newport News, Va.

Division of Ser. No. 177,319, Apr. 4, 1988, Pat. No. 4,826,074, which is a division of Ser. No. 21,649, Mar. 4, 1987, Pat. No. 4,756,470. This application Oct. 26, 1988, Ser. No. 262,948

Int. Cl.[4] B65D *5/02*

U.S. Cl. 229—134 **65 Claims**



1. A carton for packaging ice cream or the like, comprising:

(a) a receptacle, including hingedly connected front, bottom and rear panels;

(b) said front panel and said rear panel each having top, bottom, left and right edges;

(c) said bottom panel having front, rear, left and right edges;

(d) said front panel being hingedly connected at its bottom edge to said front edge of said bottom panel;

(e) said bottom panel being hingedly connected at its rear edge to said bottom edge of said rear panel;

(f) a cover including a cover panel having front, rear, left and right edges;

(g) said cover panel being hingedly connected at its rear edge to said top edge of said rear panel of said receptacle;

(h) said cover further including a closure flap hingedly connected to said front edge of said cover panel;

(i) means for securing said closure flap to said front panel;

(j) said panels of said receptacle and said cover each having left and right end flaps connected to said left and right edges respectively forming hinge lines therebetween;

(k) said left end flaps of said receptacle and said cover being dimensioned to form a substantially sealed left end of said carton;

(l) said right end flaps of said receptacle and said cover being dimensioned to form a substantially sealed right end of said carton;

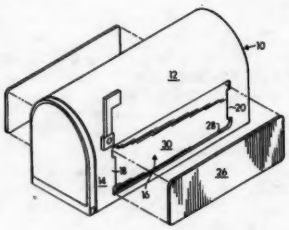
(m) said front panel having a membrane flap extending from the top edge of said front panel;
(n) said left and right front panel end flaps each having a membrane flap extending from said top edges;
(o) said left and right front panel end flap membranes and said front panel membrane forming a substantially continuous lip extending inwardly and along at least a portion of the outer periphery of said receptacle;
(p) pocket means for receiving a portion of said cover panel end flaps adjacent said rear panel for reforming said carton subsequent to initial removal of said closure flap from said front panel;
(q) said pocket means including rear panel end flaps forming an exterior portion of said pocket means operably associated with at least one of said front panel and bottom panel flaps of said receptacle forming an interior portion of said pocket means;
(r) said bottom panel end flaps include first and second portions;
(s) said front panel end flaps each include a cut-out formed adjacent said hinge line formed intermediate said bottom panel and the corresponding bottom panel end flap; and
(t) said second portion of said bottom panel end flap is offset from said first portion and operably associated with said corresponding front panel end flaps adjacent said cut-out for providing said second portion substantially planar with at least a portion of said corresponding front panel end flap.

4,872,610

DISPLAY MAILBOX WITH INTERCHANGEABLE INSERTS

Robert J. Grabowiecki, Hamden, Conn., assignor to G & H Corporation of Connecticut, Inc., New Haven, Conn.

Filed May 16, 1988, Ser. No. 194,498
Int. Cl.[4] B65D *91/00*
U.S. Cl. 232—17 **16 Claims**



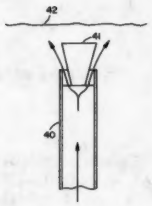
1. A display mailbox comprising:
a mailbox enclosure having at least one exterior surface;
a recess positioned on the exterior surface of the mailbox bounded by a perimeter wall and a backing wall;
at least two flanges located on the sides of the recess, each flange having an inwardly facing surface projecting over the recess; and
an insert constructed of sheet material of appropriate size to fit into the recess inside the perimeter wall and behind the inwardly facing surfaces of the flanges whereby it is securely held in the recess, the insert being of suitable size and material for the presentation of a design thereon, and including a pair of opposed tabs which are held under the inwardly facing surfaces of the flanges.

4,872,611

VENTURI-LESS WATER NOZZLE

Alan S. Robinson, El Monte, and Mark W. Fuller, Studio City, both of Calif., assignors to Wet Enterprises, Inc., Universal City, Calif.

Continuation of Ser. No. 48,563, May 11, 1987, abandoned. This application Oct. 11, 1988, Ser. No. 256,121
Int. Cl.[4] F21P *7/00*; B05B *1/14*
U.S. Cl. 239—18 **16 Claims**



1. A submergible nozzle for use in a water fountain, such water fountain comprising a pool of water having a water surface, said nozzle comprising:
a pipe means having a longitudinal axis, inside and outside surfaces, and first and second open ends, said first open end being attached to a water supply source;
a dispersion means disposed adjacent to said second open end of said pipe means, a first portion comprising a first length of said dispersion means being disposed within said second open end of said pipe means, and a second portion, comprising a second length of said dispersion means being disposed adjacent to said second open end of said pipe means, said pipe means and dispersion means being entirely located at a predetermined depth under said water surface during the operation of said nozzle;
said first portion of said dispersion means being shaped such that an annular space is formed between said first portion of said dispersion means and the inside surface of said pipe, said annular space decreasing in cross sectional area along a first direction running parallel to said longitudinal axis of said pipe from said first end of said pipe to said second end of said pipe, such that a flow of water from said water supply source, being split as it flows through said annular space, is accelerated by said decrease in annular cross-sectional area prior to emerging from said second end of said pipe;
said second portion of said dispersion element shaped such that said split flow of water emerging from said second end of said pipe is diverted radially outward away from said longitudinal axis of said pipe, said split flow forming an aeriated mound of flowing water that extends above said water surface, said aeriated mound of flowing water being produced by entrainment, in part, of water located in a portion of said pool of water directly above said dispersion means, said mound having a height and a width, the ratio of said height to said width being approximately between 0.4 and 3.0, said mound being characterized by its attractiveness when illuminated with light from below and the elimination of any unsightly adjacent apparatus.

4,872,612

ROCKET MOTOR EXTENDIBLE NOZZLE EXIT CONE

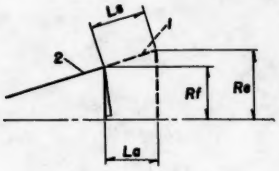
Victor Singer, Newark, Del., assignor to Morton Thiokol, Inc., Chicago, Ill.

Division of Ser. No. 876,570, Jun. 20, 1986, Pat. No. 4,766,657, which is a continuation-in-part of Ser. No. 762,472, Aug. 5, 1985, abandoned. This application Jul. 23, 1987, Ser. No. 76,953
Int. Cl.[4] B63H *11/10*
U.S. Cl. 239—265.19 **11 Claims**

1. A rocket motor extendible nozzle for attachment to a

rocket motor nozzle having a throat area for increasing the ratio of the effective rocket motor nozzle/extendible nozzle exit cone effective area to the rocket motor nozzle throat area comprising:

an arcuate-shaped membrane (16) of ductile heat resistant material, said membrane (16) having opposed arcuate edges (51, 52) one (51) of which is longer than the other (52) having ends (46, 48) that are adapted to be brought into edge-to-edge relationship to form a frustum of a cone, (10), the membrane portion forming that aft end of said frustum of a cone being deformed by a plurality of cooperating crease lines of first and second sets, each of the crease lines of said first and second sets having an apex, with the apex of each of the crease lines of the first set (28, 54, 62, 64, 68, 72, 74, 78, 80, 82, 84, 86, 88) pointing at the viewer from the exterior of the membrane when formed into a frustum of a cone (10) and the apex of each of the



crease lines of the second set (90, 92, 94, 96, 98, 100, 102, 104, 106) pointing away from the viewer, the crease lines of said first set running both circumferentially and longitudinally of said frustum of a cone (10) and the crease lines of said second set running longitudinally only thereof, with the crease lines that run circumferentially forming a plurality of fold lines (28, 34, 54) that are approximately equidistant from each other, the fold line (28) closest the larger diameter end (51) of the cone being substantially the same distance therefrom as from the fold line (34) adjacent thereto, whereby said frustum of a cone (10) may be folded inwardly, axi-symmetrically thereof, in multiple layers from the aft end for compact stowage relative to said rocket motor, and whereby said extendible nozzle may be unfolded to the extended position thereof by a forward-to-aft flow of rocket motor gas therethrough upon firing of said rocket motor.

4,872,613

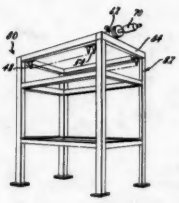
MASTIC ADHESIVE FIXTURE

Daniel E. Hucul, c/o Auto/Con Corp., 35380 Union Lk Rd., Mt. Clemens, Mich. 48043, and Ronald R. Matheson, 53340 Beechwood Dr., Utica, Mich. 48087

Filed May 18, 1987, Ser. No. 51,279

Int. Cl.[4] B05B *15/06;* **F01B** *15/06*

U.S. Cl. 239—280 **11 Claims**



11. An assembly for applying a fluid from a fluid storage supply, said assembly comprising;

means for supplying a fluid from a fluid supply;

means for supplying compressed air from a remote air supply source;

an air cylinder having a first piston slideably disposed therein for receiving air from said air supply means;

a fluid cylinder connected to said air cylinder and having a second piston slideably disposed therein and connected to said first piston for receiving fluid from said fluid supply means and injecting the fluid to the workpiece in response to actuation of said first piston having air supplied thereto;

a solenoid having a first position to allow air to flow from said air supply means to said air cylinder and a second position to vent air from said air cylinder to atmosphere; and

a support frame including a plurality of elongated members and accumulator means disposed substantially within at least one of said elongated members for receiving air from said air cylinder in response to the actuation of said first piston within said air cylinder and for transmitting air from said accumulator means after the actuation of said first piston to return said first piston to said first position and venting the air from said air cylinder to atmosphere upon return of said first piston.

4,872,614

FUEL INJECTION NOZZLE

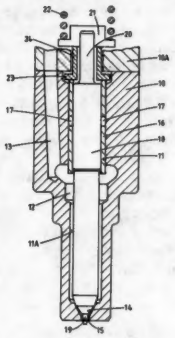
Godfrey Greeves, Hatch End, and Robert J. Fry, Greenford, both of England, assignors to Lucas Industries Public Limited Company, Birmingham, England

Filed Feb. 1, 1988, Ser. No. 150,883

Claims priority, application United Kingdom, Feb. 6, 1987, 8702712

Int. Cl.[4] F02M *47/00*

U.S. Cl. 239—533.9 **1 Claim**



1. A fuel injection nozzle for supplying fuel to an internal combustion engine comprising a valve member of varying diameters, with an abrupt change in diameter defining a step near one end of the valve member, said valve member being slidable axially within a sleeve which is axially slidable in a bore formed in a nozzle body, resilient means engaging a spring abutment mounted on said one end of the valve member, the resilient means being located within a chamber defined in a nozzle holder to which the nozzle body is secured, the resilient means acting to bias the valve member into contact with a seating to prevent flow of fuel from an inlet through an outlet, the valve member and the sleeve being subject to the pressure of fuel at the inlet, a tubular push piece surrounding said reduced portion of the valve member, said push piece at one end being engageable with said spring abutment, a flange at the other end of the push piece, the flange being engageable by said sleeve so that the force developed by the fuel pressure acting on the sleeve will be applied to the spring abutment, the

movement of the sleeve being limited by the abutment of a first surface of the flange with an end surface of the nozzle holder and the movement of the valve member being limited by the abutment of the step on said valve member and with a second surface of the flange of the push piece.

4,872,615

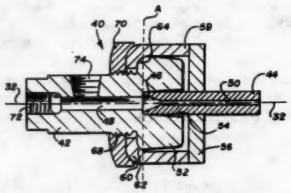
FLUID-JET-CUTTING NOZZLE ASSEMBLY

Terrance L. Myers, Columbus, Kans., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Continuation of Ser. No. 161,631, Feb. 29, 1988, abandoned. This application Mar. 6, 1989, Ser. No. 319,039

Int. Cl.[4] B05B *15/08*

U.S. Cl. 239—587 **4 Claims**



2. Apparatus for achieving optimum alignment of a nozzle in a nozzle body, comprising:

an enlarged shoulder at a discharge end of the nozzle body, the nozzle body having a central bore formed therein and a conical opening formed in the discharge end, a wider end of the conical opening being downstream of a narrower end of the conical opening., the central bore and the conical opening interfacing at a plane passing through an arcuate surface formed on the shoulder;

the nozzle also having a central bore including an enlarged portion at one end thereof, the nozzle being mounted in the conical opening of the shoulder such that the enlarged portion interfaces at the plane, the central bores of the nozzle body and the nozzle being in substantial alignment and an external transverse dimension of the nozzle being smaller than a transverse dimension of the conical bore at corresponding locations.;

a collar having a portion closely encircling the nozzle and said collar interconnecting the nozzle and the nozzle body, the collar having an arcuate rim in mating engagement with the arcuate surface of the shoulder; and

means for locking the collar in a selected position, the locking means having an arcuate surface in engagement with the arcuate rim of the collar.

4,872,616

APPARATUS FOR ELECTROSTATIC COATING OF OBJECTS

Hans Behr, Stuttgart; Kurt Vetter, Remseck; Rolf Schneider, Burgstetten, and Fred Luderer, Leutenbach, all of Fed. Rep. of Germany, assignors to Behr Industrieanlagen GmbH & Co., Bietigheim-Bissingen, Fed. Rep. of Germany

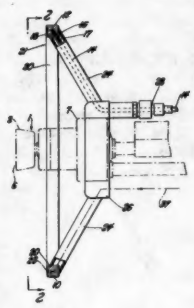
Division of Ser. No. 207,022, Jun. 14, 1988, which is a continuation of Ser. No. 12,082, Feb. 6, 1987, abandoned. This application Dec. 19, 1988, Ser. No. 286,363

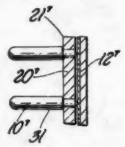
Claims priority, application Fed. Rep. of Germany, Mar. 19, 1986, 3609240

Int. Cl.[4] B05B *5/04*

U.S. Cl. 239—703 **3 Claims**

1. An apparatus for electrostatically coating of objects with an electrically conductive coating material comprising; an internal housing (7), and an atomizer (1) mounted on said housing (7) and including a spraying head (2) for atomizing the material and projecting the atomized material radially therefrom, and electrode mounting means (20') disposed annularly and radially about said atomizer (1) and having an end face (21'), a plurality of electrodes (10') spaced annularly about said mounting means (20') for creating an electrical field between said electrodes (10') and the object to be coated, an electrical conductor (12) disposed within said electrode mounting means (20') for establishing an electrical connection between said





plurality of electrodes (10') and a high voltage source, said assembly characterized by said electrodes (10') being insulated with an insulating material (31) disposed about said electrodes (10') for increasing the surface path between said electrodes (10'), said insulated electrodes (10') disposed on said end face (21') of said electrode mounting means (20') and projecting from said end face (21') toward the object to be coated.

4,872,617

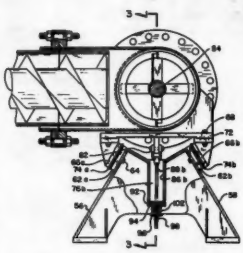
CANTED, SPRING-LOADED FEED SCREW SUPPORT

James D. Foresman, Hughesville, Pa., assignor to Sprout-Bauer, Inc., Muncy, Pa.

Filed Jun. 2, 1988, Ser. No. 201,530

Int. Cl.[4] B02C *7/14*

U.S. Cl. 241—247 **18 Claims**



1. In a disc-type refiner system having a refiner casing, a disc mounted for rotation within the casing, an elongated feed housing rigidly attached to one side of the casing, a rotor supported along an axis within the feed housing for supplying feed material to the disc, a pedestal situated under the housing

for supporting the housing, and a base for supporting the casing, the improvement comprising:

a pair of pedestal bearing blocks attached to the pedestal and having a respective first pair of planar surfaces oriented obliquely upward at equal angles to the vertical such that the axis of the rotor lies on the intersection of the first planar surfaces, if extended;

a pair of housing bearing blocks attached to the housing and having a respective second pair of planar surfaces oriented obliquely downward in contact with the first pair of planar surfaces for transferring the weight of the housing to the bearing blocks, said first and second pairs of planar surfaces being adapted to permit coplanar relative motion; and

means for biasing the second planar surfaces into contact with the first planar surfaces.

4,872,618

APPARATUS FOR WINDING COIL ON TOROIDAL CORE

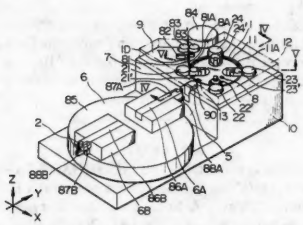
Hiroshi Sato, Yokohama; Toshijiro Ohashi, Chigasaki; Toyohide Hamada, Yokohama; Yukimori Umakoshi, Odawara; Takamichi Suzuki; Yuuji Wada, both of Yokohama; Shigeo Hara, Minamiashigara, and Youshuke Fukumoto, Odawara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Division of Ser. No. 888,430, Jul. 23, 1986, Pat. No. 4,771,956. This application May 3, 1988, Ser. No. 189,644

Claims priority, application Japan, Aug. 2, 1985, 60-169832; Nov. 22, 1985, 60-261433; May 21, 1986, 61-114556; May 29, 1986, 61-122343; Jul. 4, 1986, 61-156034

Int. Cl.[4] H01F *41/08*

U.S. Cl. 242—4 R **19 Claims**



1. An apparatus for winding a length of wire on a toroidal core to form a coil thereon, the apparatus comprising:

means providing first and second substantially circular and parallel surfaces defining a substantially circular slit therebetween;

an annular wire guide means formed with a cutout, said wire guide means including means defining a substantially annular groove extending along an outer periphery of said circular slit and having, as viewed in an axial section, first and second wire-guiding surfaces spaced radially of the annulus and extending circumferentially thereof, and a substantially annular third wire guiding surface forming a bottom of said annular groove, said second wire-guiding surface being radially inward of said first wire-guiding surface and having an axial dimension shorter than an axial dimension of said first-wire guiding surface, said wire guide means further including means providing a fourth wire-guiding surface extending over said annular groove to cooperate therewith to define an annular wire guide channel with a radially inward faced gap left between said second and fourth wire-guiding surfaces such that said annular wire guide channel is communicated with said circular slit through said radially inwardly faced gap;

feed roller means including a plurality of pairs of feed rollers, each pair of feed rollers comprising inner and outer rollers, the inner roller being disposed radially inwardly of said first wire-guiding surface, the rollers of each pair engaging each other inside the annular groove and having axes of rotation located perpendicular to a plane in which the annular wire guide means is located;

at least one core holding means for holding the toroidal corn in a position in which the wire winding portion of the toroidal core is disposed in said cutout of the annular wire guide means;

means for drivingly rotating said feed roller means whereby the wire is fed through the annular groove to form a loop in which the wire winding portion of the toroidal core is included; and

means for bringing the inner rollers of the plurality of pairs of rollers out of engagement with their respective associated rollers and moving the inner rollers way from said circular slit; whereby the wire of the loop can be moved through said circular slit to reduce the size of the loop until the wire is wound around the wire winding portion of the core.

4,872,619

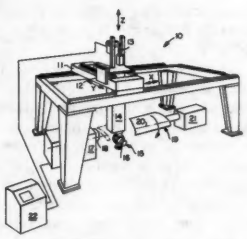
SERCO DRIVEN REDIRECT ROLLER APPARATUS FOR FIBER PLACEMENT MACHINE

Mario M. Vaniglia, Southgate, Ky., assignor to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Nov. 2, 1988, Ser. No. 265,970

Int. Cl.[4] B21F *17/00*; B32B *31/00*

U.S. Cl. 242—7.21 **2 Claims**



1. In a fiber placement machine, having a band of fibers oriented with its length running along a path with respect to a relatively stationary machine member, the band of fibers being ultimately paid-out to a fiber application surface, an improved fiber guidance system comprising:

a fiber supply creel including plural spools of fiber mounted to said relatively stationary machine member, said fiber supply creel also including means for maintaining tension on said fibers;

a manipulator wrist affixed to said relatively stationary machine member;

a fiber placement head affixed to said manipulator wrist, and having a fiber payout zone, said head capable of being manipulated through a variety of spatial orientations by said manipulator wrist, especially at least two-dimensional spatial orientations with respect to said relatively stationary machine member;

a plurality of fiber redirect rollers, having roller elements rotatable about a roller axis with respect to a roller base, each said roller base including a bearing member for providing rotary movement of said base about a swivel axis transverse to the roller axis as said fiber placement head is manipulated;

power means for driving at least one of said roller bases about its respective swivel axis; and

means for controlling manipulator movements,

wherein at least a first redirect roller is affixed to said relatively stationary machine member and at least a second redirect roller is affixed to said fiber placement head, and

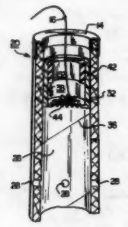
wherein a band of fibers is trained around said first and second redirect rollers under tension, and said redirect rollers are swivelled about their bases by said power means, in accordance with spatial orientation of the placement head, to thereby maintain control of the fibers.

4,872,620

BOBBIN BLOW OUT PLUG

Don Brown, St. Pauls, N.C., assignor to Burlington Industries, Inc., Greensboro, N.C.

Filed Jan. 18, 1988, Ser. No. 145,528
Int. Cl.[4] B65H 75/10, 75/18
U.S. Cl. 242—118.3 10 Claims



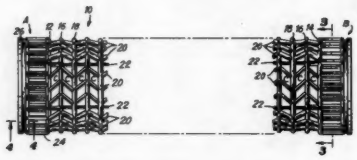
1. An improved yarn package holder comprising:
(a) a tube onto which a length of yarn
can be wound; and
(b) an end plug located within one end of said tube, said end plug including an elongated tubular member configured to fit within the tube and a base integrally formed with one end of said member, said base having perrforations to permit the passage of air through said member, said end plug being operable to prevent snagging of the yarn end on the inner surface of said tubes wherein the axial dimension of said end plug member is greater than the inside diameter of the tube, thereby providing for self-alignment of said end plug within the tube.

4,872,621

SPRING DYE TUBE

Alvin D. Thomas, Valatie, N.Y., assignor to Crellin, Inc., Chatham, N.Y.

Continuation-in-part of Ser. No. 117,677, Nov. 5, 1987, abandoned. This application Oct. 25, 1988, Ser. No. 261,272
Int. Cl.[4] B65H 75/20
U.S. Cl. 242—118.11 13 Claims



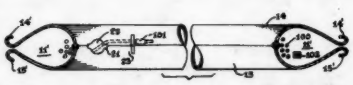
1. A spring dye tube, comprising:
a pair of end rings, at least one intermediate ring; said at least one intermediate ring being concentrically arranged relative to said end rings;
a plurality of wavyform elements disposed between the end rings and forming with said end rings and said at least one intermediate ring the periphery of said tube, said elements being grouped about said periphery; said groups being separated by elongated axial stiffening members extending from one of said end rings to the other and rigidly secured thereto;
and integral with each of said end rings a stiffening, anti-buckling section including an outwardly extending end rim and a plurality of spaced parallel ribs securing said rim to an end ring.

4,872,622

EXTENSION CORD WINDING AND STORAGE APPARATUS

Ronald N. Mansfield, 12851 SW. 22nd St., Miami, Fla. 33175

Filed Oct. 12, 1988, Ser. No. 256,516
Int. Cl.[4] B65H 75/36, 75/40
U.S. Cl. 242—85.1 5 Claims



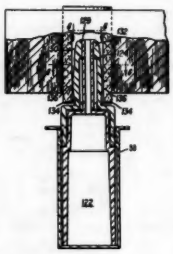
1. A cord winding and storage apparatus for use with diverse elongated cords wherein some of the diverse cords are provided with male and female plug elements wherein the cord winding and storage apparatus comprises:
a storage unit including a receptacle member having an enlarged central opening wherein the receptacle member comprises two receptacle segments each having a generally S-shaped cross-sectional configuration wherein the receptacle segments are joined along one common edge to form an enlarged storage unit receptacle and the free ends of the receptacle segments are provided with outwardly curved lip elements which define an elongated relatively narrow fluted peripheral slit which extends completely around the receptacle member and wherein the free ends of the receptacle segments are capable of flexure relative to one another to enlarge the said peripheral slit to accommodate cords having different diameters.

4,872,623

FILM ROLL HOLDER WITH DRUM BRAKE

Daniel J. Parry, and John C. Parry, both of Severna Park, Md., assignors to J. C. Parry & Sons, Inc., Baltimore, Md.

Continuation-in-part of Ser. No. 924,442, Oct. 29, 1986, Pat. No. 4,722,493. This application Feb. 1, 1988, Ser. No. 150,964
The portion of the term of this patent subsequent to Feb. 2, 2005, has been disclaimed.
Int. Cl.[4] B65H 75/02
U.S. Cl. 242—96 12 Claims



1. A holder for a roll of stretch film, comprising
a handle including a substantially cylindrical body and a shaft extending from one end of said body,
an arbor rotatably mounted upon said shaft,
means on said arbor for engaging said film roll, thereby

constraining the roll and the arbor to rotate together upon said shaft, and

a collar on said arbor adjacent said handle body, whereby one holding said handle body may create a braking torque on said roll by applying radial pressure to said collar,

wherein said arbor has an axial bore and said shaft has an enlarged tip having a major diameter greater than that of said bore, said tip being sufficiently elastically deformable to permit said arbor to be installed upon the shaft, and to retain the arbor thereafter, and further comprising

a flexible hand grip around both said handle body and said collar to protect one's hand from discomfort and injury while transmitting said radial pressure to said collar.

4,872,624

DRIVE ARRANGEMENT POR A VEHICLE HAVING A PROPELLER

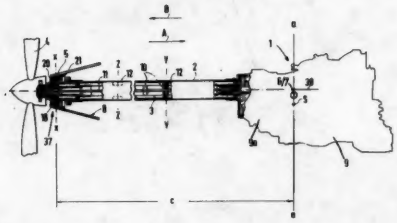
Juergen Hawener, Moeglingen; Kim Havemann, Weissach, and Rolf V. Sivers, Rutesheim, all of Fed. Rep. of Germany, assignors to Dr. Ing. h.c.f. Porsche AG, Stuttgart, Fed. Rep. of Germany

Filed May 25, 1988, Ser. No. 198,446

Claims priority, application Fed. Rep. of Germany, May 26, 1987, 3717632

Int. Cl.[4] B64D *27/00, 35/00*

U.S. Cl. 244—54 **24 Claims**



1. A drive arrangement for an aircraft of the type having a fuselage housing a drive unit which is operatively connected to drive a propeller, comprising:

a longitudinally installed tubular support means connected at one end with the drive unit,

a central propeller driving shaft supported in the tubular support means and drivingly interconnecting the drive unit with the propeller,

and at least three bearing support means for supporting the drive unit and tubular support means at the fuselage, a first of the bearing support means being provided adjacent the propeller end of the tubular support means for supporting the tubular support means, the other bearing support means being provided in the area of the drive unit for supporting the drive unit,

wherein the tubular support means consists of a glass fiber-reinforced plastic material and wherein the central shaft made of carbon-fiber-reinforced plastic material is supported in the tubular support means.

4,872,625

UNIVERSAL MODULE ASSEMBLY FOR SPACE STRUCTURES

Charles C. Filley, 1207 Saxony, Houston, Tex. 77058

Continuation-in-part of Ser. No. 635,635, Jul. 30, 1984, abandoned. This application Jan. 6, 1987, Ser. No. 717

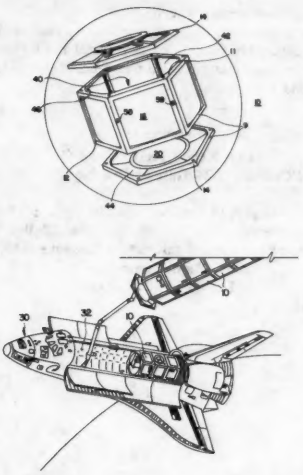
Int. Cl.[4] B64G *1/10*

U.S. Cl. 244—159 **21 Claims**

1. A universal module assembly, comprising:

a pressure vessel having cylindrical side walls and curved end surfaces; and

framework means integrally attached to and contiguous with the exterior of and surrounding the pressure vessel for providing the primary structural rigidity to the module assembly and the primary structural support from the pressure vessel, and for facilitating the interconnection of said framework means of said module assembly with the framework means of another like module assembly, said framework means including a body portion disposed



around said cylindrical side walls and end portions covering said curved end surface of said pressure vessel, said body portion of said framework means being in the general configuration of a right hexagonal prism having six rectangular faces and two hexagonal faces, and said end portions of said framework means are generally frustoconical in configuration.

4,872,626

INSULATED ANCHORING CLAMP FOR INSULATED ELECTRIC CONDUCTOR EQUIPPED WITH A CARRYING CABLE

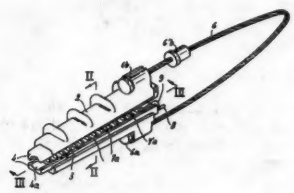
Jean-Pierre Liénart, Isere, France, assignor to Malico S.A., Isere, France

Filed Nov. 5, 1987, Ser. No. 116,837

Claims priority, application France, Nov. 6, 1986, 86 16027

Int. Cl.[4] H02G *7/05*

U.S. Cl. 248—63 **12 Claims**



1. An anchoring clamp for an insulated electric conductor equipped with an insulated carrying cable comprising:

a split sleeve formed of a material more yieldable than hard

metal and provided with a mooring element and a conical recess with a slight slope;

a compressible core formed of a material more yieldable than hard metal and mounted in said recess, said core including a cavity for housing the electric conductor or its carrying cable, said core having an outside shape complementary to the shape of said conical recess;

said core capable of being wedged into said recess by sliding force;

said cavity comprising a wall;

said wall comprising at least one longitudinal wall portion comprising a bar formed of hard metal and inserted in said wall, the metal bar having a free face, said free face being equipped with teeth.

4,872,627

LOCKING TRIPOD LEG

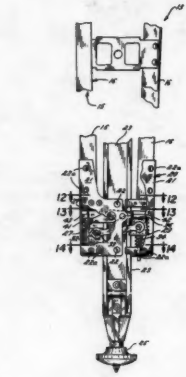
Chadwell O'Connor, 2024 Galaxy Dr., Newport Beach, Calif. 92660

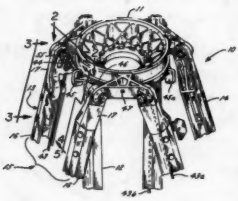
Continuation-in-part of Ser. No. 101,504, Sep. 28, 1987. This application Aug. 5, 1988, Ser. No. 229,081

The portion of the term of this patent subsequent to Jun. 20, 2006, has been disclaimed.

Int. Cl.[4] F16M *11/32*

U.S. Cl. 248—168 **7 Claims**





4. A leg for a tripod comprising, in combination, an elongated upper leg portion adapted to be secured to a tripod head at its upper end, a housing guide rigidly secured to the lower end of said upper leg portion, a lower leg portion having a uniform cross section through a leg adjustment range, said housing guide having a guide passage closely receiving said uniform cross section in sliding relationship so that said upper and lower leg portions can slide longitudinally and adjust the total leg length without there being bending movement between the leg portions, a set of guide elements in said housing guide for holding said lower leg portion, said guide elements being substantially in the plane of said elongated upper leg portion and having spaced contact on one side of said lower leg portion and contact intermediate said spaced contact on the other side of said lower leg portion, and means for selectively firmly clamping said guide elements against said lower leg portion so that said guide elements apply spaced forces along one side of the lower leg portion and an intermediate force along the other side of the lower leg portion, said means automatically increasing the clamping force as the load on the tripod increases.

4,872,628

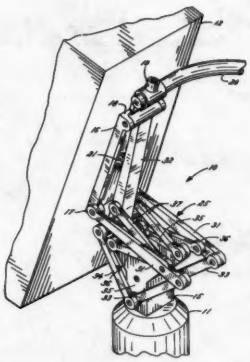
MECHANICALLY COUNTERBALANCING PLATFORM

Chadwell O'Connor, 2024 Galaxy Dr., Newport Beach, Calif. 92660

Filed Dec. 7, 1987, Ser. No. 129,469

Int. Cl.[4] F16M *11/04*

U.S. Cl. 248—178 **2 Claims**



1. An instrument supporting platform system comprising, in combination, a base, an elongated platform having front and rear portions, and linkage means connecting the platforms and said base for defining a predetermined tilting movement of the platform both up from the horizontal, causing the front portion of the platform to rise, and down from the horizontal, causing the rear portion of the platform to rise, said linkage means further including means for defining predetermined paths of travel whether the platform is tilted up or down from the horizontal to cause the center of the platform to rise sufficiently far to cause a point at a fixed perpendicular distance from the top of the platform to maintain a substantially absolute vertical height and to raise slightly as the platform is increasingly tilted, said point corresponding substantially to the center of gravity of an instrument supported on said platform, whereby the instrument supported on said platform is automatically substantially counterbalanced by gravity at any position of the platform relative to the horizontal when the platform is tilted up from the horizontal and when the platform is tilted down from the horizontal.

4,872,629

ADJUSTABLE ANCHOR BRACKET FOR NON-INVASIVE ATTACHMENT TO MASONRY WALL

Michael W. Cothran, 1880 Wrondel Way, Reno, Nev. 89502, and Nelson, III: Alvin T., 2249 Old Creek Cir., Pittsburg, Calif. 94565

Filed Sep. 12, 1988, Ser. No. 242,557

Int. Cl.[4] A47B *96/00*

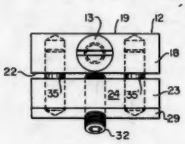
U.S. Cl. 248—231.2 **8 Claims**

1. An adjustable anchor bracket adapted for non-invasive

detachable attachment in the mortar joint of a masonry wall, comprising:

(a) a first monolithic body member;

(b) a second monolithic body member parallel to said first monolithic body member and selectively movable toward or away from said first monolithic body member between a first dimension in which said first and second monolithic bodies are contiguous and project a combined thickness less than the width of a mortar joint to a second dimension in which said first and second monolithic bodies press tightly against the masonry units on opposite sides of the mortar joint when applied thereto; and



(c) means adjustable disposed between said first and second monolithic bodies selectively manipulable to move said first and second monolithic bodies from said first dimension to said second dimension;

(d) said first and second monolithic bodies being each provided with corresponding front and rear faces and top and bottom faces connecting said front and rear faces, said rear faces lying recessed in said mortar joint when said bracket is applied to said masonry wall and the top face of said first monolithic body and the bottom face of said second monolithic body detachably engaging the associated surfaces of the masonry units on opposite sides of said mortar joint when said bracket is attached to said masonry wall.

4,872,630

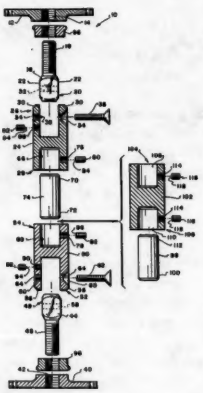
UNIVERSALLY ADJUSTABLE MOUNTING DEVICE

Gershon Cooper, Encino, Calif., assignor to Alliance Research Corporation, Chatsworth, Calif.

Division of Ser. No. 168,582, Mar. 3, 1988, Pat. No. 4,836,485, which is a continuation of Ser. No. 4,736, Jan. 30, 1987, abandoned. This application Jun. 24, 1988, Ser. No. 211,052

Int. Cl.[4] F16M *13/00*

U.S. Cl. 248—278 **6 Claims**



3. In an adjustable mounting bracket of the type which includes a plate adapted to be removably attached to a body that is to be positioned at a selected position relative to a supporting base, and a shaft having a threaded shank portion engaged in a threaded opening extending perpendicularly through the plate, the subcombination of:

said shaft having a head end with flattened sides opposite said shank portion;

a joint member having a fork-shaped end and a base end opposite thereof, said fork-shaped end having a pair of tines receiving said flattened sides of said head end of said shaft therebetween and a first threaded hole extending transversely through one of said tines, said base end having a cylindrical counterbore extending axially thereinto and a second threaded hole extending transversely therethrough into said counterbore;

bolt means extending transversely through said tines and said head end of said shaft, and spaced longitudinally apart from said first threaded hole, for frictionally and compressively retaining said shaft in a selected pivotal position relative to said joint member;

a first set screw extending through said first threaded hole and having an end in compressive and frictional engagement with said head end of said shaft for locking said shaft in said selected pivotal position against shock and vibration;

a connecting rod having a first end adapted for attachment to said surface and a second end received in said counterbore for positioning said member in a rotationally and axially adjustable position thereon; and

a second set screw extending through said second threaded hole and having an end in compressive and frictional engagement with said rod for retaining said member on said rod in said position.

4,872,631

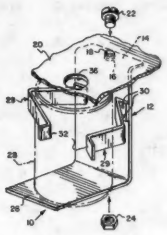
DRIP-CAN HOLDER

Frank Rutigliano, 16 Poplar St., Centereach, N.Y. 11720

Filed Oct. 14, 1988, Ser. No. 258,005

Int. Cl.[4] A47K *1/08*

U.S. Cl. 248—313 **1 Claim**



1. A grease collecting receptacle holder for a barbecue cooker, said cooker having a port in the bottom thereof through which grease and other residual materials which collect in said cooker may pass, and an opening proximate to said port in the bottom of said cooker for attaching thereto a holder for a grease collecting can or the like comprising:

(a) a plate formed from a solid material and having a top portion, a bottom portion, and first and second side portions;

(b) a mounting lip extending from the top portion of said plate and substantially perpendicular thereto, said mounting lip having an opening therein adapted for alignment with the opening in the bottom of said cooker whereby said mounting lip may be removably secured to said cooker;

(c) a support lip extending from the bottom portion of said plate and substantially perpendicular thereto in a direction opposite to that of said mounting lip, said support lip being adapted to align with said port and to support thereon a receptacle for receiving and collecting the grease and other materials passing through said port;

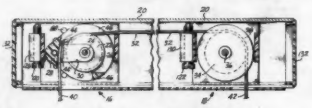
(d) first and second substantially V-shaped spring clips fixedly secured respectively to the first and second side portions of said plate and extending horizontally therefrom in the direction of said support lip whereby said spring clips are spaced apart with the open portion of the V of each of said spring clips facing the open portion of the V of the other said clip, each of said spring clips having a short wing portion extending angularly outwardly from each end thereof forming two additional angular extensions in each of said spring clips, the said wing portions at the inside end of each said spring clip being adpated to be secured to said plate, and the wing portions at the outside end of said spring clip being adapted to provide at their junctions with the body of each spring clip a cam means for spreading said first and second spring clips apart when a receptacle is inserted between said spring clips, the open portion of the V of each of said spring clips being adapted to securely hold said receptacle.

4,872,632

ADJUSTABLE OVERHEAD HANGER WITH LOCK PULLEY

Van P. Johnson, 7722 12th NW., Seattle, Wash. 98117

Filed Sep. 27, 1988, Ser. No. 250,773
Int. Cl.[4] A47B *96/06*
U.S. Cl. 248—332 **16 Claims**



1. An apparatus for suspending articles from an overhead member, comprising:

an elongated support member attachable to said overhead member;

a first pulley having an axis and being supported by said support member;

an abutment radially spaced from said first pulley and having a use position fixed relative to said support member;

a second pulley supported by said support member and spaced from said first pulley, said first and second pulleys being substantially co-tangential;

a cord having two ends and passing over said first pulley radially inwardly of said abutment and further over said second pulley, the end of said cord proximal to said second pulley being attachable to an article to support said article at a height determinable by movement of said cord over said pulleys;

a pivoting lock member which pivots coaxial with and operably independent from said first pulley;

wherein said cord is normally freely movable over said pulleys, but may be restricted from movement in one direction by clamping engagement of the cord between said lock member and said abutment.

4,872,633

AIR RATCHET HOLDER

Michael C. Sullivan, 7772 Darwin Ave., Midway City, Calif. 92655

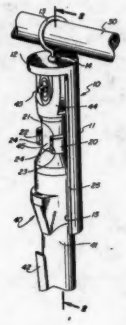
Filed Apr. 4, 1988, Ser. No. 177,330
Int. Cl.[4] B42F *13/00*
U.S. Cl. 248—340 **16 Claims**

1. For use in receiving and holding an air ratchet having a head, a shaft and a handle, a holder comprising:

a concave body having a cradle portion defining a cradle interior and an end cap;

a hook secured to and extending from said end cap; and

clasp means, supported within said cradle interior, for grasping said shaft of said air ratchet and supporting said air



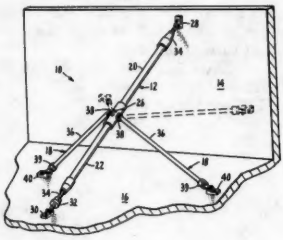
ratchet solely by said shaft in an attachment in which said ratchet may be withdrawn from said holder by movement away from said concave body.

4,872,634

BRACING FOR TILT-UP WALL PANEL

Kenton P. Gillsdpy, and David L. Kelly, both of Sacramento, Calif., assignors to The Burke Company, Sacramento, Calif.

Filed Aug. 29, 1988, Ser. No. 238,333
Int. Cl.[4] F16M *13/00*
U.S. Cl. 248—354.3 **6 Claims**



1. A wall bracing apparatus for bracing a wall panel with respect to a floor, said apparatus comprising:

an elongated main brace including wall mounting means disposed at one end thereof for securing that end of the main brace to a wall panel, and including floor mounting means disposed at the other end thereof for securing that end of the main brace to a floor; and

two elongated lateral bracing legs of equal length, each coupled by a two-axis pivot at one end of the lateral bracing leg to the main brace at a location between the two ends of the main brace, and each including mounting means separate from the wall and floor mounting means disposed at the other end of the lateral bracing leg for securing that end of the lateral bracing leg to the floor or wall panel at a position spaced laterally apart from the vertical plane of the main brace.

4,872,635

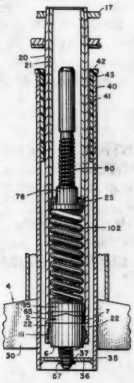
SLIP CONNECTOR FOR WEIGHT ACTUATED HEIGHT ADJUSTORS

Glenn A. Knoblock, Kentwood, and Brian L. Scolten, Jenison, both of Mich., assignors to Steelcase Inc., Grand Rapids, Mich.

Division of Ser. No. 850,510, Apr. 10, 1986, Pat. No. 4,709,894. This application Aug. 31, 1987, Ser. No. 91,585

Int. Cl.[4] A47C 3/24

U.S. Cl. 248—406.2 11 Claims



1. In combination, a chair having a base, a seat supported thereon, and a height adjustor, comprising:

a threaded spindle supported on said base;

a threaded nut threadedly engaging said spindle and being adjustably supported thereon;

a bearing surface supported on said nut;

a sleeve slidably mounted on said spindle for vertical movement therealong, and including a stop surface which abuts and is supported on said bearing surface when a preselected overload weight is applied to said chair;

a column having an upper end thereof connected with said seat, and a lower end thereof connected with said sleeve;

a spring positioned between said bearing surface and said sleeve, and biasing said seat away from said base when said chair is occupied;

said sleeve and said spring being mutually positioned such that when said chair is occupied by an average user, the stop surface of said sleeve is spaced apart from said bearing surface, and when said preselected overload weight is applied to said chair, said seat moves downwardly to compress said spring and positively support said seat on said base.

4,872,636

EXTERIOR MIRROR FOR A VEHICLE

Bernhard Mittelhäuser, Am Krähenberg, D-3002 Wedemark 2, and Bernd Winkler, Burgwedel, both of Fed. Rep. of Germany, assignors to Bernhard Mittelhäuser, Wedemark, Fed. Rep. of Germany

Filed Apr. 22, 1988, Ser. No. 185,166

Claims priority, application Fed. Rep. of Germany, Apr. 24, 1987, 3713689

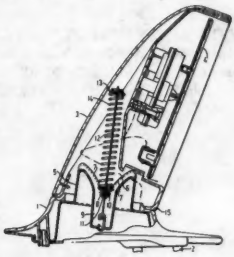
Int. Cl.[4] A47G 1/16

U.S. Cl. 248—475.1 8 Claims

1. In an exterior mirror for a vehicle, including a support that is adapted to be mounted on the vehicle, and a housing that accommodates a mirror body and is mounted on said support in such a way that it is pivotable to the front and to the rear relative to the forward direction of travel of said vehicle, with said housing being pivotable against a spring force in such a way that after a pivoting movement, said housing returns to a normal position, the improvement wherein:

said support is provided with an approximately V-shaped recess that is delimited by a base and two side surfaces;

rod means and a slide member are substantially vertically disposed as to each other and mounted relative to said housing and in a normal position, said slide member rests against said base of said channel under spring force; during pivoting of said housing in a given direction, said slide member, against said spring force, moves along one



of said side surfaces of said recess, while during pivoting of said housing in the opposite direction, said slide member moves along the other of said side surfaces of said recess; and wherein

spring means is connected to said mirror support for providing said spring force against said slide member to thereby provide said spring force to return said housing to a normal position,

said side surface of said recess of said mirror support having a convex configuration.

4,872,637

DIE MEMBER FOR FORMING A LOST FOAM PATTERN

Russell J. VanRens, Milwaukee, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Jun. 3, 1988, Ser. No. 202,876

Int. Cl.[4] B22C 7/02

U.S. Cl. 249—59 9 Claims

9. A die member for forming a foam pattern for casting a cylinder block in a lost foam casting process, the pattern having a cylindrical bore with an axis, a helical transfer passage including a first portion permitting die member separation in the direction along the axis of the cylindrical bore, a first undercut portion preventing one-pie die member separation in the direction along the axis of the cylindrical bore, a second portion permitting movable core separation along a line in a plane substantially perpendicular to the axis of the cylindrical bore, and a second undercut portion preventing one-piece core separation along said line, and the pattern also having a helical finger passage adjacent the transfer passage, said die member comprising a main portion forming the cylinder bore and including a projection forming the second undercut portion of the transfer passage, a first part of the second portion of the transfer passage, and a first part of the first portion of the

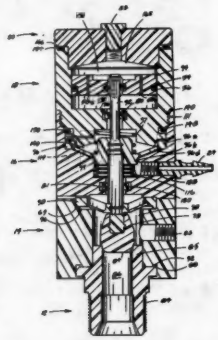
transfer passage, and a core carried by said main portion and movable relative to said main portion along said line, said core being movable between an extended position in which said core forms a second part of the first portion, a second part of the second portion, the first undercut portion, and the finger passage, and a retracted position in which said core is withdrawn from the first undercut portion, is partially withdrawn from the second portion and is withdrawn from the finger passage and affords removal of said die member from the pattern in the direction along the axis of the cylindrical bore.

4,872,638

SLOW ACTING FLUID VALVE

Raymon F. Thompson, and Larry Funk, both of Kalispell, Mont., assignors to Semitool, Inc., Kalispell, Mont.

Filed Jan. 29, 1988, Ser. No. 150,383
Int. Cl.[4] F16K *31/126, 31/122*
U.S. Cl. 251—54 **7 Claims**



4. A slow-acting pneumatically operated fluid valve for semiconductor fabrication equipment, the valve being designed to minimize fluid supply system shocks that can dislodge particles within the supply system and contaminate components of the semiconductor fabrication equipment when the valve is opened or closed, comprising:

a sealed axially aligned multi-part valve enclosure including a valve seat housing, an actuator housing a cylinder housing, and a cylinder end cap;

an elongated valve stem movably mounted in the actuator housing of the valve enclosure for axial movement relative to it;

a first sealed chamber formed within the actuator housing of the valve enclosure, the first sealed chamber being axially bounded by first and second diaphragms each having a rim sealed to the valve enclosure and a central section sealed and fixed to the valve stem at axially spaced positions along its length, the rim of the first diaphragm being sealingly disposed between the valve seat housing and the actuator housing and the rim of the second diaphragm being sealingly disposed between the actuator housing and the cylinder housing;

fluid inlet means formed through the actuator housing of the valve enclosure in communication with the first sealed chamber for selectively directing fluid under pressure into the first sealed chamber to move the valve stem in a first axial direction relative to the valve enclosure;

at least one biasing means within the actuator housing of the valve enclosure, the biasing means being operably connected between the valve enclosure and valve stem for urging the valve stem in an axial direction opposite to the first axial direction;

a poppet at one axial end of the valve stem;

a valve seat formed within the valve seat housing of the valve enclosure and axially facing the poppet, the valve seat being in fluid communication between first and second ports extending through the valve seat housing of the valve enclosure;

a second sealed chamber formed in the cylinder housing of the valve enclosure, the second sealed chamber being bounded at one axial end by one of the first and second diaphragms; and

the cylinder cap being fixed to the cylinder housing to close off the second sealed chamber;

damping piston means fixed to the valve stem within the second sealed chamber inn the cylinder housing for restricting and controlling axial movement of the valve stem relative to the valve enclosure;

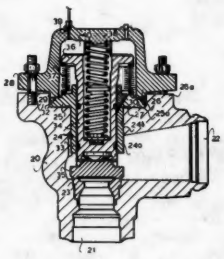
whereby the actuation speed of the valve stem, in response to pressure of fluid directed into the first sealed chamber overcoming the biasing means, is slow and uniform throughout the entire movement of the valve stem.

4,872,639

PILOT-CONTROL SAFETY VALVE

Andre Gemignani, Saint Mitre Les Rempapts, France, assignor to Societe d'Exploitation de Brevets Pour l'Industrie et la Marine Sebim, Chateauneuf, France

Filed Aug. 19, 1988, Ser. No. 234,967
Claims priority, application France, Aug. 25, 1987, 87 12172
Int. Cl.[4] F16K *31/126*
U.S. Cl. 251—61.4 **15 Claims**



1. A pilot-controlled safety valve, comprising:

a valve body formed with a first passage connected to a pressurizable space to be protected against a pressure excess, a second communicating with the exterior of said valve body, and means forming an annular generally horizontal valve seat around said first passage;

a guide sleeve axially aligned with said valve seat and spaced therefrom, said guide sleeve having a tubular portion extending toward said seat and a peripheral collar at an upper end of said tubular portion bearing against an annular surface of said valve body and supported thereby;

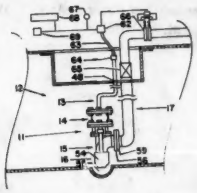
a cap affixed to said valve body over said guide sleeve and having an annular surface bearing against said collar for clamping said collar between said surfaces;

a shaft guided in said sleeve and formed at an upper end thereof with a peripheral collar overlying the peripheral collar of said guide sleeve, said upper end of said shaft being exposed to a fluid pressure in said cap urging said shaft toward said seat with a pilot pressure for holding said valve closed and which, upon reduction, permits opening of said valve by pressure in said space;

a valve member on a lower end of said shaft positioned to engage upon said seat for closing the valve upon application of said pilot pressure in said cap; and

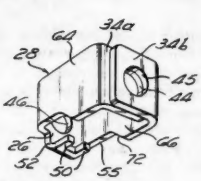
a variable-length metal jacket having an upper end sealingly connected to said peripheral collar of said shaft, and a lower end sealingly connected to the peripheral collar of said guide sleeve and contracted in a closed position of said valve, an outer surface of said jacket, said cap and said upper end of said shaft delimiting a chamber receiving said pilot ressure.

4,872,640
VALVE APPARATUS
John E. Schwartz, 1642 Buckhorn La., Billings, Mont. 59105
Continuation-in-part of Ser. No. 865,806, May 22, 1986, abandoned. This application Apr. 25, 1988, Ser. No. 71,850
Int. Cl.[4] F16K *31/126*
U.S. Cl. 251—147 4 Claims



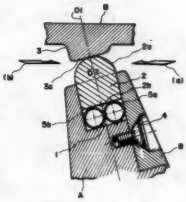
1. A normally-closed valve apparatus for mounting within a vessel containing a fluid, gas, or liquid product, said valve apparatus comprising an actuator assembly; a valve body assembly having a product passage, said product passage having continuous walls that are free of openings; and a valve assembly having a valve seat; said actuator assembly including at least one draw bar straddling said valve body assembly; and said actuator assembly further comprising a sealing member, said sealing member being attached by said draw bar to a cylindrical block, and said sealing member being actuated by said product from within said vessel to thereby move said cylindrical block into engagement with said valve seat to shut the flow of product through said valve apparatus, and said cylindrical block being movable by said draw bar away from its engagement with said valve seat to open said valve apparatus and allow passage of said product through said valve apparatus.

4,872,641
GAS PRESSURE REGULATOR MOUNTING YOKE
Thomas F. Fangrow, Jr., Corona, Calif., assignor to Life Support Products, Inc., Irvine, Calif.
Filed Jul. 22, 1988, Ser. No. 223,161
Int. Cl.[4] F16K *51/00*; F16L *5/00*
U.S. Cl. 251—148 12 Claims



1. A yoke assembly for mounting a pressure regulator on a gas cylinder outlet valve structure, comprising:
a yoke with a closed loop configuration having a pair of spaced, generally flat, parallel side walls defining open sides to enable the yoke to fit on said structure;
a regulator base integrally joined to said walls; a hole in said base for attachment of said yoke to said regulator;
one or more indexing pins formed integral with said base, said pins being bent from the base to extend generally perpendicular to said base and being adapted to fit within indexing holes formed in sadi valve structure on said cylinder; and
a handle end wall spaced from and extending generally parallel to said base, and joined to said side wall, said handle end wall being adapted to receive a stem of a handle for attaching said yoke to said cylinder structure, wherein said side walls, said base, said handle end wall, and said pins are of a one-piece construction.

4,872,642
SEAL MECHANISM FOR BUTTERFLY VALVE WITH PRESS CONTACTING SEAL EFFECTIVE IN BOTH INFLOW AND OUTFLOW DIRECTIONS
Akira Oshima, No. 136, Idogayanakamachi, Minami-ku, Yokohama-City, Japan
Filed Sep. 2, 1988, Ser. No. 240,831
Claims priority, application Japan, Jan. 21, 1988, 63-12195
Int. Cl.[4] F16K *25/00*
U.S. Cl. 251—173 3 Claims



1. A seal mechanism for butterfly valve of concentric opening with press contacting seal, comprising a ring-formed seal metal arranged surrounding the valve body under insertion in a radially displaceable manner in a circumferential groove formed around the circumference of the valve body, said seal metal having a rounded outer peripheral face; a seat metal disposed surrounding the inner wall of the valve casing and formed integrally therewith, with its seat face inclining relative to the conduit direction of the valve casing; and two tubular buffer rings inserted in said groove of the valve body in between the bottom of the groove and the inner circumference of the seat metal, each of said tubular buffer rings being split along its entire looping length on the upper or lower side of the ring so as to leave a C-shaped cross section to thereby provide a resilient radial support force for said seal metal on said groove bottom at the neutral position on the seat face between the thrust force components in the inflow and the outflow directions of the valve whereby, if the thrust force components imparted to either one side of the valve body increases, the supporting force by the buffer ring will be increased for the corresponding buffer ring on said one side by the intrusion of fluid passing through the valve thereinto from the split thereof, resulting in the building up of a balance between the thrust force components and the supporting force for maintaining a seal between said seal metal and said seat metal.

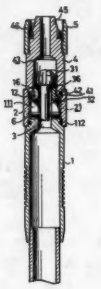
4,872,643
VALVE
Yi C. Lo, 8 Fl., No. 312, Sec. 4, Chung Hsiao E. Rd., Taipei, Taiwan, assignor to Robert C. Lin and Yi C. Lo, both of Taipei, Taiwan
Filed Mar. 17, 1989, Ser. No. 324,899
Int. Cl.[4] F16K *31/528*
U.S. Cl. 251—252 12 Claims

1. A valve, comprising:
a primary tube having two successive reduced diameter portions formed on one end thereof, a first reduced diameter portion having a larger diameter being formed on one end of the primary tube and a second reduced diameter portion with a smaller diameter being formed on an outer free end of the first reduced diameter portion, two slots being formed on the opposite sides of the first reduced diameter portion, and a first sealing ring being fitted at an

abutment of the primary tube and the first reduced diameter portion;

a secondary tube, one end of the second reduced diameter portion being connected to said secondary tube, said secondary tube having a reduced diameter annular flange formed on one end thereof, and a sealing ring being fitted on an outer surface of the flange;

a piston-like element having a head portion being slidable in a bore of the secondary tube, and a rod portion being



slidable in a bore of the primary tube, a transverse hole being formed on the rod portion, and a second sealing ring being fitted at an abutment of the head portion and the rod portion;

a pin being slidable in the transverse hole; and

a rotatable control ferrule being rotatably disposed between the primary tube and the secondary tube, two guide slots being formed on the opposite sides of an inner surface of the control ferrule for receiving and guiding opposite ends of the pin.

4,872,644

MOTOR VEHICLE SERVICING TOOL

Peter A. Papapetros, 41-49 Victoria Street, Alexandria New South Wales 2015, Australia

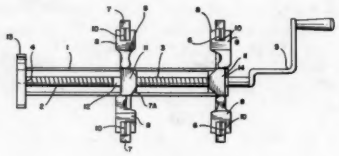
PCT No. PCT/AU86/00038, § 371 Date Aug. 18, 1987, § 102(e) Date Aug. 18, 1987, PCT Pub. No. WO87/03837, PCT Pub. Date Jul. 2, 1987

PCT Filed Feb. 14, 1986, Ser. No. 110,746

Claims priority, application Australia, Dec. 23, 1985, 04001

Int. Cl.[4] B23P *19/04*

U.S. Cl. 254—10.5 **6 Claims**



1. A tool for compressing a motor vehicle suspension strut coil spring, comprising a rack,

two pairs of upwardly curved arms, one pair being rigidly secured to one end of the rack, and the other pair being adapted to slide along the rack,

two pairs of cleats, each cleat being mounted on a respective one of said arms, and adapted to engage said coil spring intermediate its ends, whereby said coil spring may be compressed,

each of said cleats being movable relative to and along its respective arm so as to adjust for different diameters of coil spring, a cradle affixed to one of said rack to assist in supporting part of said motor vehicle suspension strut as the coil spring is compresed.

4,872,645

COIL SPRING COMPRESSOR

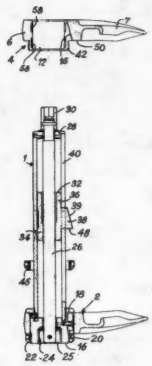
Michel Dossier, Paris, France, assignor to Facom, Morangis, France

Filed Aug. 2, 1988, Ser. No. 227,251

Claims priority, application France, Aug. 7, 1987, 87 11325

Int. Cl.[4] B60P *1/48*

U.S. Cl. 254—10.5 **8 Claims**



1. A coil spring compressor comprising:

a longitudinal guide tube having a longitudinal axis, an axially extending slot in said guide tube;

two jaws provided for the insertion therebetween of respective spaced-apart coils of a compressible coil spring which is to be compressed, said jaws being mounted on said guide tube in confronting relation to each other in a radial plane containing said axis, one said jaw being axially fixed relative to said tube and the other said jaw being axially slidable on said tube, each said jaw comprising in a single piece two arms forming claws or clamps and a tubular body defining a bore having such section relative to a substantially complementary section of said guide tube as to provide a slidable mounting of the respective said jaw on said guide tube;

a slide axially slidably mounted in said guide tube and having a radially extending projecting portion extending through said slot and out of said guide tube;

an actuating screw rotatively mounted in said guide tube on said axis thereof and engaged with said slide for adjusting the axial position of said slide relative to said guide tube by rotation of said screw; and

means for rigidly and detachably securing securing said axially slidable jaw to said slide and comprising a screw-threaded skirt coaxial with said bore of said slidable jaw and defining an extension of said bore of said slidable jaw and axially extending from a first side of said slidable jaw directed toward said fixed jaw, a groove provided in said bore of said slidable jaw and in said skirt and axially extending in said radial plane and having a tapering shape in said radial plane with a radial depth which progressively increases from a second side of said slidable jaw remote from said fixed jaw to said first side directed toward said fixed jaw, said groove being continued into said skirt, said radially extending projecting portion of said slide extending into said groove, said groove and said projecting portion each having a substantially rectangular section in a plane perpendicular to said axis, a tapped ring screw-threadedly engageable on said screw-threaded skirt and in axially abutting relation to said projecting portion, said

projecting portion having a shape substantially complementary to said tapering shape of said groove, whereby said slidable jaw is rigidly secured to said projecting portion and said slide when said ring is in abutting relation to said projecting portion.

4,872,646

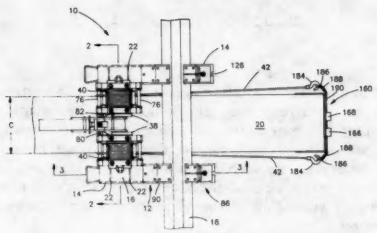
RAILROAD TIE REPLACEMENT APPARATUS

James C. Siano, P.O. Box 2061, Media, Pa. 19063

Continuation of Ser. No. 74,443, Jul. 16, 1987, abandoned, which is a continuation-in-part of Ser. No. 893,660, Aug. 6, 1986, abandoned, which is a continuation of Ser. No. 798,885, Nov. 18, 1985, abandoned. This application Sep. 28, 1988, Ser. No. 252,033

Int. Cl.[4] E01B *29/22*

U.S. Cl. 254—43 41 Claims



1. Apparatus for replacing railroad ties by removing a first railroad tie from position under conventional railroad tracks by moving said first tie transversely to said track and inserting a second, replacement tie into the vacant tie position by moving said second replacement tie in a direction opposite to the direction to removal of said first tie, while permitting train passage over said track while said apparatus is in place for said first tie removal and said second tie insertion, comprising:

a. a pair of longitudinally elongated spaced apart support members adapted to be inserted between a conventional railroad track rail and ballast beneath said rail, transversely with respect to said rail, on either side of said first tie to be removed from under said rail and on either side of space vacated by said first tie into which said second tie is to be inserted beneath said rail, portions of upper surfaces of said support members being substantially flat and adapted to be positioned coplanar with the lower surface of the base of said rail for flush facing contact therewith;

b. a bridging member secured to said support members, fixedly positioning said support members spaced apart with respect to each other sufficiently to permit said support members to be inserted beneath said rail on either side of said tie to be removed;

c. transversely positioned shaft means rotatably mounted on and spaced above said bridging member;

d. reel means fixedly connected to and rotatable with said shaft, for selectably collecting and dispensing flexible line means in either longitudinal direction with respect to said tie upon shaft rotation in a single direction;

e. said flexible line means residing on said reel means, having a first end secured to said reel means and having a remaining end loose and providing means for converting rotation of said reel means in said single direction to tensile force applied along said longitudinal direction of said line means;

f. means mounted on said support members, for releasably engaging said rail below the operating surface thereof and preventing relative movement of said apparatus with respect to said rail;

g. lever means extending radially outwardly from said shaft, for rotating said shaft in response to angular movement of said lever with respect to said shaft upon said lever being connected with said shaft;

h. first ratchet means for selectably connecting said lever with said shaft for rotation of said shaft in a first rotational direction upon lever angular movement in a first angular direction with respect to said shaft and for lever angular movement in a second angular direction, opposite said first angular direction, without shaft rotation resulting;

i. second ratchet means, selectably engaging said shaft, for precluding shaft rotation in other than said first rotational direction;

j. means for selectably engaging said first ratchet means with said shaft;

k. means for selectably engaging said second ratchet means with said shaft; said shaft being freewheeling when said respective selectable ratchet engagement means are disengaged; and

l. means for transferring tensile force in said line means to an end of either said first or said second tie in the direction of longitudinal travel thereof during respective removal from or insertion into position under said railroad track, including means for adjustably facilitating clasping of said force transferring means about ties of different sizes.

4,872,647

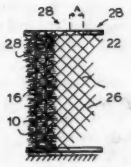
DECORATIVE ATTACHMENT FOR A CHAIN LINK FENCE

Francis M. Paradise, and James R. Paradise, both of 134-11 Hillside Ave., Jamaica, N.Y. 11418

Filed Sep. 29, 1987, Ser. No. 102,036

Int. Cl.[4] E04H *17/00*

U.S. Cl. 256—1 5 Claims



1. An artificial hedge and/or shrubbery assembly comprising a chain link fence having a plurality of interlocking wires twisted together at spaced intervals to form a plurality of diamond shaped openings arranged in parallel rows, and a plurality of camouflage assemblies supported on said fence said camouflage assemblies comprising a central elongated axial support element and relatively stiff densely packed filament means fixedly carried by said support element and extending laterally of the axis thereof, said filament means forming a bush-like planar array that extends along the entire length of said support element, at least one of said camouflage assemblies being inserted in a selected plurality of rows of openings in said fence such that said support element passes through the openings in said selected rows so that when a plurality of such elements are thus inserted the fence assumes a hedge-like appearance.

4,872,648

REACTION VESSEL FOR PROCESSING STEEL

Heinz Holtermann, Meerbusch, and Arno Luven, Krefeld, both of Fed. Rep. of Germany, assignors to Technometal Gesellschaft fiir Metalltechnologie mbH, Duisburg, Fed. Rep. of Germany

Filed Aug. 11, 1988, Ser. No. 231,186

Claims priority, application Fed. Rep. of Germany, Aug. 11, 1987, 3726646

Int. Cl.[4] C21C 7/10

U.S. Cl. 266—275 8 Claims

1. In an airtight reaction vessel having a lining of refractory material for immersion in steel-processing ladles, with said reaction vessel including an upper vessel part, a lower vessel part, and immersion pipes, with these components being interconnected via respective flange means that include, for each component, an upper main flange and a lower main flange, whereby the upper main flange of one of said components is interconnected to the lower main flange of another of said components via clamping mechanisms, the improvement wherein:

a compensator ring is disposed between the main flanges of each two associated vessel components, with said compensator ring having a first end that rests on said upper main flange of said associated components, and a second resilient free end; and

said upper main flanges are each provided, as part of said flange means, with a separate upper flange ring that is disposed on said second resilient free end of said compensator ring between said compensator ring and the lower main flange of said associated components, whereby in an unstressed state of said flange means, said flange ring extends slightly beyond a projection of an upper rim of that vessel component of said associated components that carries said upper main flange.

4,872,649

LIQUID TYPE MASS DAMPER WITH ELONGATED DISCHARGE TUBE

Shigeya Kawamata, Shihei, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 23, 1988, Ser. No. 159,062

Claims priority, application Japan, Feb. 25, 1987, 62-041793

Int. Cl.[4] F16F 9/04, 7/10; F16M 13/00; E02D 27/34

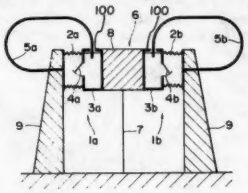
U.S. Cl. 267—136 2 Claims

1. A liquid type mass damper comprising:

a sealed cylindrical liquid container having an axial dimension and a radial dimension, said liquid container being expandable in an axial direction with minimum changes in its sectional area for different internal pressures;

a liquid reservoir positioned adjacent said cylindrical liquid container, said liquid reservoir and said cylindrical liquid container defining an opening providing communication between said cylindrical liquid container and said liquid reservoir; a liquid disposed in said liquid container and said liquid reservoir; check valve means positioned within said opening for preventing said liquid from flowing from said cylindrical liquid container to said liquid reservoir and allowing liquid to flow substantially unrestricted from said reservoir to said container;

a long and narrow liquid discharge tube having a length which is significantly longer than the axial dimension of said cylindrical liquid container and having a tube cross section which is significantly smaller than said opening,



said liquid discharge tube extending out of said container and into said reservoir, said liquid reservoir having an opening to atmosphere, said cylindrical liquid container and said adjacent liquid reservoir being disposed between structural elements such that said liquid container expands and contracts in an axial direction of said cylindrical liquid container according to the vibrations of said structural elements.

4,872,650

VIBRATION INSULATING DEVICE

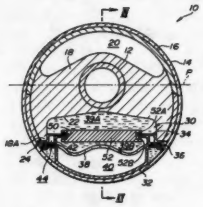
Toshiyuki Tabata, Sagamihara; Tatsuro Ishiyama, Yokohama; Takao Ushijima, Chigasaki, and Takuya Dan, Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama and Bridgestone Corporation, Tokyo, both of, Japan

Filed Jun. 15, 1988, Ser. No. 206,718

Claims priority, application Japan, Jun. 19, 1987, 62-152609

Int. Cl.[4] F16F 5/00

U.S. Cl. 267—140.1 17 Claims



1. A vibration insulating device comprising:

an inner cylinder;

an outer cylinder disposed surrounding said inner cylinder;

an elastic support member tightly interposed between said inner and outer cylinders;

means defining a hollow in said elastic support member, at least major part of said hollow being located on one side of a plane containing axis of said inner cylinder;

means defining first and second liquid chambers between a part of said elastic support member on the other side of said plane and inner periphery of said outer cylinder;

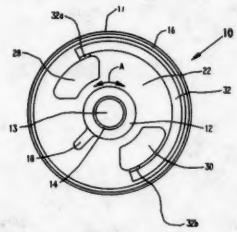
means defining a restriction passage through which said first and second liquid chambers are in communication with each other to be restricted in flow of liquid; and

means defining an air chamber filled with air, said air chamber being adjacent to one of said first and second chambers through a flexible partition wall.

4,872,651
FLUID FILLED RESILIENT BUSHING

Richard P. Thorn, Erie, Pa., assignor to Lord Corporation, Erie, Pa.

Filed Mar. 14, 1988, Ser. No. 167,943
Int. Cl.[4] F16F *5/00*
U.S. Cl. 267—140.1 **31 Claims**



1. A fluid filled resilient bushing assembly for transmitting motion including rotary oscillatory motions between a motion inducing member and a base member while substantially damping rotary oscillatory motions between said members comprising:

an elongate outer rigid sleeve member;

an elongate inner rigid member disposed within and radially inwardly spaced from said outer sleeve member to define a space therebetween;

a resilient means disposed about said inner rigid member between said inner rigid member and said outer rigid sleeve member for sealingly connecting said inner rigid member to said outer rigid sleeve member to permit the inner rigid member to rotatably oscillate with respect to said outer rigid sleeve member while undergoing elastic stress during rotation,

said resilient means defining at least two spaced chambers interconnected by an elongated restricted passageway; said spaced chambers including radial walls extending in the radial direction of the bushing assembly and circumferential walls extending in the circumferential direction of the bushing assembly; said restricted passageway interconnecting said spaced chambers only through said circumferential walls;

an incompressable fluid filling said spaced chambers and said restricted passageway,

a pressure differential inducing means creating a differential in the fluid pressure of said at least two spaced chambers, resulting from said rotary movement of the inner rigid member with respect to the outer rigid sleeve member permitting contraction of one chamber, and expansion of the other chamber by fluid flow therebetween via said restricted passageway.

4,872,652
TWO CHAMBER ENGINE MOUNT

Gerhard Rohner, Hemsbach; Werner Idigkeit, Weinheim, and Klaus Kurr, Weinheim-Hohensachsen, all of Fed. Rep. of Germany, assignors to Firma Carl Freudenberg, Weinheim/-Bergstr., Fed. Rep. of Germany

Continuation of Ser. No. 49,587, May 12, 1987, abandoned. This application Oct. 12, 1988, Ser. No. 257,140
Claims priority, application Fed. Rep. of Germany, Jun. 11, 1986, 3619685
Int. Cl.[4] F16M *1/00*; B60K *5/12*; F16F *13/00, 15/04*
U.S. Cl. 267—140.1 **7 Claims**

1. A two-chamber engine mount comprising:

(a) means defining a working space;

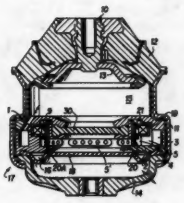
(b) means defining a compensation space;

(c) a liquid filling said working space and said compensation space;

(d) a choke canal having an inlet at one end communicating with the working space and an outlet at another end communicating with said compensation space;

(e) said choke canal having at least one transverse passage disposed between said inlet and said outlet and being parallel to said outlet;

(f) a valve means for selectively opening and closing said at least one transverse passage said at least one transverse passage to permit fluid communication between said compensation space and said choke canal in response to a



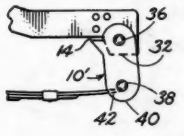
signal whereby the amount of liquid resonating in the choke canal when the engine mount is subject to vibration is dependent upon selective operation of the valve means; and

wherein said choke canal is annular and further including an inner annular chamber communicating with said at least one transverse passage, said valve means comprising an annular member having a plurality of openings communicating with said compensation space, and a cylindrical member slidably disposed with respect to said annular member to selectively cover and uncover said openings to selectively permit fluid communication between said at least one transverse passage and said compensation space.

4,872,653
SHACKLE FOR USE IN LIMITING THE MOVEMENT OF AN END OF A LEAF SPRING IN A WHEELED VEHICLE

Brian N. Chuchua, 920 S. Mohler Dr., Anaheim, Calif. 92807

Filed Apr. 11, 1988, Ser. No. 180,159
Int. Cl.[4] B60G *11/12*; F16F *1/28*
U.S. Cl. 267—271 **4 Claims**



1. A shackle for use in limiting the rotation of an end of a leaf spring which comprises:

a body having a top end and a bottom end, top and bottom bearing means located on said body adjacent to said top and said bottom ends, respectively, for use in pivotally mounting said shackle, and stop means located on said body for limiting the rotation of said body when it is rotated about the axis of said top bearing by physically engaging a member located adjacent to said shackle wherein

said spring is of such a length that when it is bent as a result of rotation of said shackle said stop means will limit the rotation of said shackle by engaging said frame so as to preclude rotation of said shackle to such an extent that said spring will not be deformed to the extent of being

damaged as a result of being bent to accommodate such shackle rotation;

said body comprises two parallel, spaced side plates and a connecting plate located transverse to said side plates and extending between said side plates, said edge being capable of engaging the frame of a vehicle upon which said shackle is used in order to limit rotation of said shackle, and

said stop means is an edge on said connecting plate which is spaced from said bearing means.

4,872,654

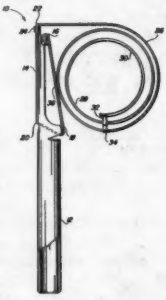
WORK-HOLDING IMPLEMENT AND BENCH-MOUNTED LOADING FIXTURE THEREFOR

Harold A. Seele, 6636 Sherbourne Dr., Los Angeles, Calif. 90056

Filed Feb. 18, 1988, Ser. No. 156,991

Int. Cl.[4] B25B *13/52*

U.S. Cl. 269—3 **9 Claims**



1. A work-holding implement comprising:

a handle; and

multi-turn torsion spring means for holding a circular workpiece including an inwardly facing gripping surface along a first portion and slidable bearing surfaces along a second portion thereof, said means being attached at one end to said handle, the other end being biased radially inwardly to frictionally engage a circular workpiece positioned therein;

said spring means comprising:

a spirally wound spring band coil having an innermost turn and at least one outer turn, with most of an inner circumference of said innermost turn having a gripping surface; and

first and second band control guides extending radially outward from said innermost turn to adjacent an outermost turn of said coil.

4,872,655

WORK-HOLDING APPARATUS AND METHOD

Harold A. Seele, 6636 Sherbourne Dr., Los Angeles, Calif. 90056

Filed Feb. 16, 1988, Ser. No. 156,415

Int. Cl.[4] B25B *1/04, 1/20*

U.S. Cl. 269—130 **10 Claims**

1. A work-holding apparatus comprising:

an annular housing having an outer circumferential surface and an inner circumferential surface;

an annular member inside said housing and rotatable with respect thereto;

a biasing spring mounted in said housing, connected at one end to said housing and at another end to said rotatable annular member;

a spirally wound spring band coil having an innermost turn and at least one outer turn, said coil being attached at one end to said housing and at another end to said rotatable annular member, said band coil fitting inside said housing with an outermost turn adjacent said inner circumferential surface and having an exposed gripping surface over most of said innermost turn; and

position fixing means attached to said rotatable annular member and fixable to said housing;

wherein said position fixing means can be unfixed from said housing to tighten said spring band coil with a force of said biasing spring so that said innermost turn decreases in circumference and an object placed inside said innermost turn can be held thereby.

4,872,656

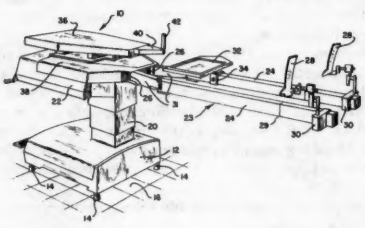
ORTHOPEDIC TABLE WITH MOVABLE UPPER BODY AND SACRUM SUPPORTS

Thomas Brendgord; Ward L. Sanders, and Dennis C. Coon, all of Erie, Pa., assignors to American Sterilizer Company, Erie, Pa.

Continuation of Ser. No. 587,926, Mar. 9, 1984, abandoned, which is a continuation of Ser. No. 332,656, Dec. 21, 1981, abandoned. This application Nov. 9, 1987, Ser. No. 119,311

Int. Cl.[4] A61G *13/00*

U.S. Cl. 269—322 **2 Claims**



1. An orthopedic table having a longitudinal axis, said table used for supporting a patient during the performance of orthopedic procedures, said table comprising:

a base bisected by a vertical plane within which the longitudinal axis of the table lies;

first table top means mounted on said base for supporting a patient's upper body, said first table top means having a first position wherein a longitudinal axis of said first table top means is colinear with the longitudinal axis of the table;

second table top means mounted adjacent to said first table top means for supporting a patient's sacrum, said second table top means having a first position wherein a longitudinal axis of said second table top means is colinear with the longitudinal axis of the table;

means for moving said first and second table top means in unitary fashion in a direction transverse to the longitudinal axis of said table to selected second positions to enable imaging equipment to be located thereunder; and

a traction mounting assembly including abductor bar means for engaging and supporting the patient's lower extremities, said abductor bar means being pivotally mounted to

and extending substantially perpendicularly from said base such that upon movement of said first and second table top means to said selected second position said abductor bar means pivot to accommodate the patient's lower extremities.

4,872,657

OPERATING TABLE WITH A PATIENT SUPPORT SURFACE TILTABLE AROUND THE LONGITUDINAL AND TRANSVERSE AXES

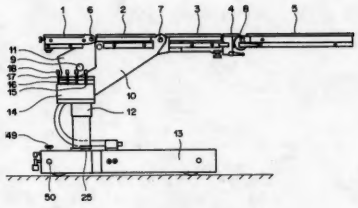
André Lissi, Wabern, Switzerland, assignor to M. Schaerer AG, Wabern, Switzerland

Filed Oct. 13, 1987, Ser. No. 107,337

Claims priority, application Switzerland, Oct. 17, 1986, 4151/86

Int. Cl.[4] A61G *13/00*

U.S. Cl. 269—325 **8 Claims**



1. An operating table having a patient support surface, said support surface being tiltable about a longitudinal axis and about a transverse axis, said support surface being comprised of a plurality of segments, pivot means pivotally connecting each segment to at least one other segment, individual drive means for tilting the patient support surface about its longitudinal axis and about its transverse axis for pivoting each segment about its pivot means and relative to at least one other segment, a control panel fixed to said table with a plurality of manually operable control levers for manually operating said individual drive means, actuator means for operating said individual drive means, and a remote control device having a sender and a receiver, said receiver having a driver stage with outputs for energizing said actuator means from a location remote from said table, characterized in that the actuating means are electromagnetic devices (43, 44, 48) and that each of the electromagnetic devices is functionally connected with one of the control levers (15–18) to operate that lever from a remote location and is connected electrically with an output of the driver stage (47).

4,872,658

FOLDER FOR BUSINESS FORMS PRESS

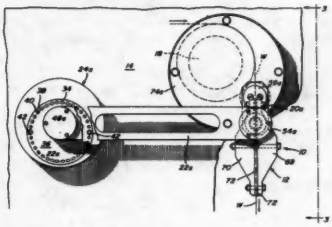
Ross A. Hoge, Westmount, Canada, assignor to M-A-N Ashton Inc., Montreal, Canada

Filed May 23, 1988, Ser. No. 197,203

Int. Cl.[4] B41L *1/32*

U.S. Cl. 270—39 **7 Claims**

1. A web folding structure comprising a frame, the frame including a pair of parallel side walls, one on either side of the web to be folded, a chute extending transversely between the side walls across the web, the chute including spindle means on either end thereof journalled in bearings in the respective side walls allowing the chute to pivot about a pivot axis extending through the spindles, the chute further including a pair of closely spaced wall surfaces defining an elongated slot adapted to pass the web therethrough, the slot defined by the wall surfaces including a plane passing through the pivot axis with the chute extending below the pivot axis to provide a pendulum motion; at least a crank arm connected to one of the spindles and a link arm connected at one end to the crank arm at a point spaced from the pivot axis, the other end of the link arm being connected to a drive wheel eccentrically thereof for providing a pendulum motion to the crank and thus the chute, characterized in that the drive wheel includes a first disc mounted to a shaft, drive means for rotating the first disc about an axis of rotation passing through the geometric center of the first disc, the first disc defining a circular recess in the outer surface thereof with the geometric center of the circular recess being offset from the axis of rotation of the first disc but the circular recess containing the geometric center of the first disc, a second disc rotatable in the circular recess, the second disc



having a geometric center coincident with the geometric center of the circular recess, the linking arm being eccentrically connected to the second disc such that the axis of the linking arm connection to the second disc is parallel to the axis of rotation of the first disc, and means are provided for detachably locking the second disc to the first disc within the circular recess such that the degree of eccentricity of the linking arm connection to the second disc can be adjusted relative to the rotation of the axis of the first disc to thereby adjust the stroke of the pendulum motion of the chute.

4,872,659

CASSETTE WITH TURN COVER AND FEED ROLLER CONTROL

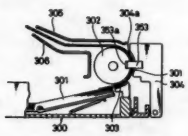
Toshio Kato, Okazaki; Kunihiro Uotani, Seto, and Mitsuhiko Ito, Toyoake, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

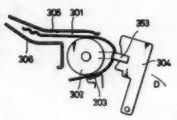
Filed Apr. 29, 1988, Ser. No. 188,307

Claims priority, application Japan, Apr. 30, 1987, 62-107079

Int. Cl.[4] B65H *3/44, 5/26*

U.S. Cl. 271—9 **5 Claims**





1. An apparatus for forming an image on a sheet of paper, comprising:

a main body;

a storing means for storing sheets of paper therein;

a feeding means for feeding said sheets of paper in said storing means into said main body in a predetermined direction and having a feed roller feeding an uppermost

sheet of paper among said sheets of paper in said storing means by a rotation thereof to a predetermined position corresponding to a conveyor roller;

a turn cover disposed on said storing means; and

a member fixed at a turn cover at one end thereof such that one sheet of paper present on said feed roller is positioned between said turn cover and the other end of said member for drawing out said one sheet of paper when said turn cover is opened.

4,872,660

SHEET FEED DEVICE FOR RECORDING APPARATUS

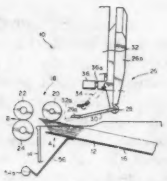
Toshiaki Kameyama, Tokyo, and Yuichi Kobayashi, Yokohama, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 124,410, Nov. 20, 1987, abandoned, which is a continuation of Ser. No. 826,816, Feb. 6, 1986, abandoned. This application Nov. 21, 1988, Ser. No. 274,747

Claims priority, application Japan, Feb. 12, 1985, 60-24670; Jun. 22, 1985, 60-93810

Int. Cl.[4] B65H *3/44, 1/08, 3/06*

U.S. Cl. 271—9 **6 Claims**



1. A sheet feed device for a recording apparatus which selectively performs automatic sheet feed and manual sheet feed, comprising:

sheet load means to be loaded with a stack of sheets to be fed for fully supporting said stack of sheets;

cylindrical sheet feed means for sequentially picking up and feeding the sheets from a top of the stack which is loaded on said sheet load means;

electric drive means for driving the sheet load means such that the sheet load means is moved from a standby position to a sheet feed position so as to place the top sheet in said stack of sheets in contact with said cylindrical sheet feed means for maintaining the contact of said top sheet with said cylindrical sheet feed means and for moving said sheet load means from the sheet feed position to the standby position in a non-sheet feed condition;

manual sheet insert means movable angularly between the sheet feed position and a receded position which is remote from the sheet feed position, said manual insert means comprising a main tray which is movable as far as the sheet feed position at one end thereof and an auxiliary tray which is rotatably connected at one end thereof to the other end of said main tray, said manual sheet feed means having a pair of tray guide plates extending each from one of opposite sides of said main tray, each of which are received in a slot formed in a side wall of said recording apparatus, said manual sheet insert means being moved to the sheet feed position when said main tray and auxiliary trays become substantially flush with each other;

sensor means for sensing a movement of said manual insert means from the receded position to the sheet feed position in a manual insertion condition;

biasing means for biasing said manual sheet insert means toward the sheet feed position; and

control means for controlling the drive means such that when said sensor means has sensed a movement of the manual insert means while the sheet load means is in the sheet feed position, the sheet load means is moved to the standby position away from the sheet feed position.

4,872,661

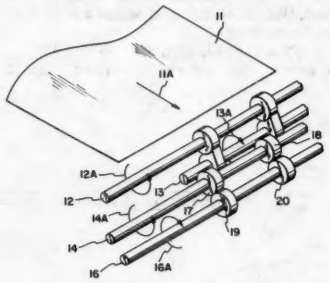
ROLL RELEASE MECHANISM

James A. Knepper, Longmont, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed May 21, 1984, Ser. No. 612,158

Int. Cl.[4] B65H *5/02, 5/04*

U.S. Cl. 271—273 **17 Claims**



1. A roll release mechanism for easy jam clearance including:

first and second parallel shafts with drive rolls mounted on said first one of said parallel shafts and mating driven rolls mounted on said second one of said parallel shafts so as to engage said drive rolls with said driven rolls,

said second shaft having at least two areas of reduced radius and at least two areas of unreduced radius,

said unreduced radius areas of said second shaft fitted within at least two bearings,

said reduced radius areas of said second shaft fitted within said bearings to disengage said driven rolls axially and radially from said drive rolls upon axial movement of said second shaft in the disengaging direction.

4,872,662

SORTING APPARATUS HAVING SORTER CONNECTABLE TO ANOTHER SORTER

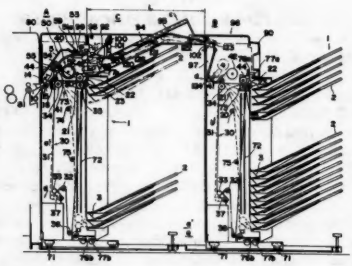
Takuma Ishikawa; Tadashi Maruyama; Akiyoshi Johdai; Kuniaki Ishiguro, and Toshio Matsui, all of Toyokawa, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jul. 8, 1986, Ser. No. 883,157

Claims priority, application Japan, Jul. 9, 1985, 60-104969[U]; Jun. 9, 1986, 61-134519

Int. Cl.[4] B65H *39/11, 39/115*

U.S. Cl. 271—290 **4 Claims**



1. A sorting apparatus comprising:

a first sorter module having a first accomodating means for accommodating and sorting sheets of paper, a delivery means including a pair of delivery rollers for discharging sheets of paper without sorting, an inlet means for accepting sheets, a first path of transport of paper for guiding the

accepted sheets from said inlet means to said first accommodating means, a second path of transport of paper for guiding the accepted sheets form said inlet means to said delivery means, wherein substantially all of said second path is distinct from said first path, and a first directing means at the inlet means for directing the accepted sheet to either said first path or said second path;

a second sorter module which is separated from said first sorter module and having a second accommodating means for accommodating and sorting sheets of paper; and

a bridge module detachably connected between said first sorter module and second and second sorter module for accommodating the discharged sheet without sorting and transporting the discharged sheet to said second sorter module;

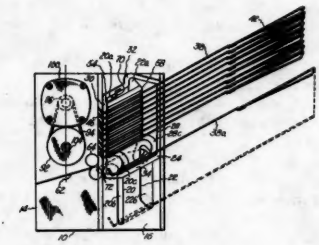
said bridge module having a third accomodating means for accommodating sheets of paper without sorting, a third path of transport of paper for guiding the sheet discharged from said delivery means to said third accommodating means, a fourth path of transport of paper for guiding the sheet discharged from said delivery means to said second accommodating means, and a second directing means for directing the discharged sheet to either said third path or said fourth path.

4,872,663

SHEET SORTER APPARATUS

Salvatore Latone, Rochester, N.Y., assignor to M.T.S.L. Associates, Rochester, N.Y.

Filed Mar. 21, 1988, Ser. No. 171,492
Int. Cl.[4] B65H *39/10*
U.S. Cl. 271—294 **15 Claims**



1. Apparatus for sorting sheets as they arrive, one at a time, from the outlet of a copying machine or the like which apparatus comprises a plurality of stacked trays having a pair of pin means extending outwardly from a side thereof, the pins being spaced from each other along said edge, a frame having an upright support plate disposed along said edge, said plate having a pair of slots generally paralleling each other into which said pin means extend, each of said pair of slots having a slot wall which is opposed to a slot wall of the other of said pair of slots and which define opposed bearing surfaces upon which said pins bear and said trays are supported, the distance between said pin means as measured along a line through their centers to their outer peripheries, being greater than the distance between said bearing surfaces and canted with respect to said slots, and a tray shifting mechanism engagable with said pins for movement of said trays one at a time along tracks defined by said slots through a region adjacent said outlet where adjacent ones of said trays are separated to receive said sheets.

4,872,664

TREADMILL HAVING IMPROVED DECK

Robert Parker, 12061 Tavel Cir., Dallas, Tex. 75230

Filed Dec. 3, 1987, Ser. No. 128,223
Int. Cl.[4] A63B *23/06*; B05D *1/36*
U.S. Cl. 272—69 **12 Claims**

1. An improved treadmill of the type wherein an endless belt is mounted upon an underlying support surface for rotation thereover, said underlying support surface being adapted for receiving the weight of a person using the treadmill and running thereupon, the improvement comprises a curable coating composition disposed on said underlying support surface such that upon curing of the coating the underlying support surface exhibits enhanced lubricity for low resistance to belt movement thereacross and high durability to abrasion, said curable coating composition consisting essentially of from about 30 to about 60 volume percent of a polymeric resin, from about 30 to about 60 volume percent of a wax compatible with the polymeric resin, and from about 2 to about 12 volume percent of a particulate constituent selected from the group consisting of metal particles and melamine particles.

4,872,665

MECHANICAL LEG-PROPULSION ASSISTANCE DEVICE

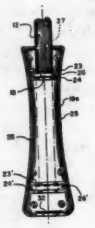
Jean-Louis Chareire, 66, rue Artistide Briand, 92300 Levallois Perret, France

Filed Oct. 16, 1986, Ser. No. 920,072
Claims priority, application France, Oct. 30, 1985, 85 16097
Int. Cl.[4] A63B *29/00*
U.S. Cl. 272—70 **10 Claims**

1. A mechanical leg-propulsion assistance device comprising a saddle having means for fastening the saddle to the hips, shoulders or hands of a user, said saddle having a center plane and having attached to said center plane a first joint, said joint having an axis which is about perpendicular to the center plane of the saddle, and to which first joint are connected two telescopic rods with one end of each rod attached to said first joint, one of the rods situated on each of the sides of said center plane, the other end of each of the telescopic rods comprising a second joint whose axis is about perpendicular to the longitudinal axis of each of the telescopic rods, said second joint having an automatic blocking and unblocking device and being connected about perpendicular to the longitudinal axis of a link arm whose other end comprises a third joint having an axis which is about parallel to the axis of said second joint, which third joint connects the link arm to means for securing the link arm to the front of a user's shoes so that the axis the third joint is spaced from and about parallel to the plane of the sole of the

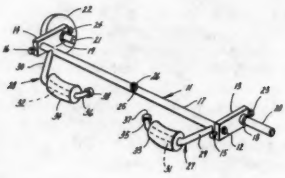
shoe, the shape of the link arm enabling it to rotate freely around the third joint without impeding the shoe, the two telescopic rods being fitted with associated motor means which, when the second joint is blocked, can assist the leg propulsion muscular force of a user.

4,872,666
SKIPPING ROPE ASSEMBLY
Kristin S. Smith, 509 Poppy Hill Rd., Watsonville, Calif. 95076
Continuation-in-part of Ser. No. 902,611, Sep. 2, 1986, abandoned. This application Mar. 14, 1988, Ser. No. 167,539
Int. Cl.[4] A63B *5/20*
U.S. Cl. 272—75 **2 Claims**



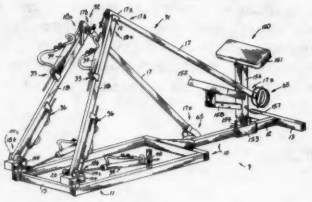
2. In a skipping rope assembly of a type including an elongate skipping element, a hollow tubular body portion disposed at the ends of said element, openings leading axially inwardly of each said body portion, handles carried at the ends of said element in a manner permitting said element to rotate within and with respect to said body portions, studs carried by said tubular bodies and formed to have a sequence of tapered conical steps disposed therealong and oriented to more easily enter the open end of said tubular body portion than to withdraw from said tubular body portion, said studs having a broad head portion for retaining said element in an associated one of said handles, said handles including a pair of elongate shell portions, said shell portions of each said handle being formed to include a pair of axially spaced pockets for receiving the head of one of said studs selectively within one or the other of said pair of pockets so as to adjust the length of said skipping element.

4,872,667
WEIGHT LIFTING APPARATUS
Dino A. Favot, 3000 Amazon, Dearborn, Mich. 48120
Filed Dec. 2, 1988, Ser. No. 278,850
Int. Cl.[4] A63B *13/00*
U.S. Cl. 272—123 **16 Claims**



1. Weight lifting apparatus comprising:
a bar having an axis;
hand grip means rotatably mounted on the bar coaxially with it to be grasped by a user;
bracket means nonrotatably held relative to the bar;
weight support means on the bracket means and radially offset from the axis of the bar;
brace means connected to the hand grip means for rotating with the hand grip means relative to the bar and for engaging the back of the user's forearm; and
means for controlling the angle of rotation of the hand grip means relative to the bar for keeping the brace means within a predetermined range of angular positions relative to the weight support means.

4,872,668
MULTIDIRECTIONAL EXERCISER
Joseph P. McGillis, 827 Rosemoss Rd. #10, Deer Lodge, Mont. 59722, and Howard G. Fly, Ovando, Mont., assignors to Joseph Patrick McGillis, Deer Lodge, Mont.
Filed Sep. 16, 1987, Ser. No. 98,021
Int. Cl.[4] A63B *21/24*
U.S. Cl. 272—130 **63 Claims**



1. An exerciser for resisting movement in any direction as applied by contacting parts of a user's body, comprising:
a base;
an elongated first member having a distal end adapted for engagement by the user, and a proximate end longitudinally spaced from said distal end;
an elongated second member which is operably connected for pivotal movement relative to the first member about a first pivot axis;
a third member which is operably connected for pivotal movement relative to the second member about a second pivot axis; said third member further being operably connected for pivotal movement relative to said base about a third pivot axis;
said first, second and third members and said base being pivotally connected to allow the first member to move in any desired direction throughout at least a portion of the first member's range of motion;
first resistance means operably connected between the first and second members for resisting pivotal movement about said first pivot axis;
second resistance means operably connected between the second and third members for resisting pivotal movement about said second pivot axis; and
third resistance means operably connected between the third member and base for resisting pivotal movement about said third pivot axis.

4,872,669
ADJUSTABLE RESISTANCE EXERCISER
Harry M. Henry, P.O. Box 533, Paradise, Calif. 95967
Filed Jan. 12, 1989, Ser. No. 296,017
Int. Cl.[4] A63B *21/00*
U.S. Cl. 272—132 **8 Claims**

1. An exercise device comprising:
a frame including a pair of elongated, vertically oriented track members and a base for maintaining the vertical orientation of said track members;
a handlebar means including an elongated tubular handlebar being horizontally lengthwise oriented, and a pair of han-

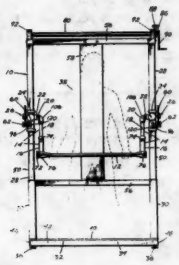
dlebar side arms, each handlebar side arm being affixed to an end of said tubular handlebar at a right angle;

a carriage mounted on each vertically oriented track member, each handlebar side arm being pivotally attached to a carriage;

adjustment means for adjusting the position of each carriage along said track member including a pair of sprockets each pivotably mounted at the upper end of each track member, a pair of chains each connected at one end to a carriage and trained about a sprocket, a turnable axle connecting said sprockets, a crank connected to said turnable axle for manually turning said sprockets and thereby adjusting the position of said carriages along said track members, and means for locking said carriages in a selected position along said track members;

a braking means mounted on each carriage for providing resistance to pivotal movement of said handlebar means, each braking means being individually adjustable; and,

a back rest mounted on said base between and said track members.

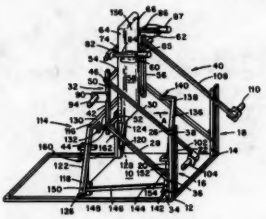


4,872,670

APPARATUS FOR SQUAT EXERCISE

Raymond L. Nichols, P.O. Box 412, Cleveland, Tenn. 37311

Filed Apr. 27, 1988, Ser. No. 186,615
Int. Cl.[4] A63B *21/00*
U.S. Cl. 272—134 **12 Claims**



1. Apparatus for exercising the muscles of the legs and hips of a user comprising:

a substantially horizontal base means;

first and second side members, each such side member defining a parallelogram, including first, second, third and fourth leg means, said first leg being fixedly secured uprightly with respect to said base means, said second and third leg means having one of their respective ends pivotally connected to said first leg means at spaced apart locations along the length of said first leg means and extending therefrom in substantially parallel relationship to one another, said fourth leg means being pivotally connected to the outboard ends of said second and third leg means at spaced apart locations along the length of said fourth leg means whereby when said second and third leg means are pivoted about their respective points of connection with said first leg, said fourth leg means moves along an arcuate path but is maintained substantially parallel to said first leg means;

said first and second side members being spaced apart from one another;

back support means mounted between said first and second side members and movable therewith;

shoulder contact means associated with said back support means and adapted to receive the shoulders of a user of the apparatus when the back of such user is in contact with said back support means for exerting a lifting force to said back support means.

4,872,671

EXERCISE DEVICE PROVIDING VARIED AND PREDETERMINED RESISTANCE

John R. Brandell, Barrington, Ill., assignor to Ronlund Sports Products, Inc., Northbrook, Ill.

Filed Aug. 3, 1988, Ser. No. 227,804
Int. Cl.[4] A63B *21/02*
U.S. Cl. 272—137 **10 Claims**

1. An exercising device comprising:

a pair of elongated tubular handles each having an end portion and a gripping portion extending substantially the length of said handle opposite said end portions, with each of said end portions providing a tubular shaft;

each of said end portions including a spinner member adapted for rotation relative to said handle and having a hook portion;

resilient means attached to said hook portions of said spinner members, interconnecting said ends of said handles;

said resilient means applying a variable resistance against the reactive universal movement of the handles with respect to each other;

said resilient means including at least a first member of a resilient material, wound in one direction to impart a twisting torque thereto and at least a second member of a resilient material wound on said first member along substantially the entire length thereof in the opposite direction to equalize the twisting torque.

4,872,672

PROPORTIONAL CONTROL WITH A JOYSTICK DEVICE FOR INPUTTING COMPUTER VARIABLES

Robert S. Hoye, Lovettsville, and Theodore H. Roach, Leesburg, both of Va., assignors to Microcube Corporation, Leesburg, Va.

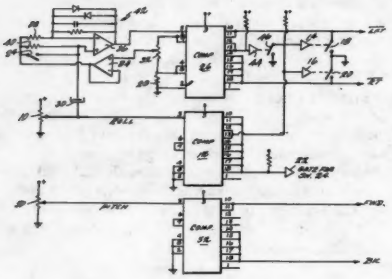
Division of Ser. No. 773,567, Sep. 9, 1985, abandoned. This application Jan. 26, 1988, Ser. No. 149,922
Int. Cl.[4] A63F *9/22*
U.S. Cl. 273—1 E **14 Claims**

1. Apparatus for providing a joystick output to a computer comprising:

a joystick including a lever and means for translating a position of said lever into a corresponding signal;

means for sequentially generating a predetermined code a

specific number of times, said specific number being related to a characteristic of said corresponding signal so that said specific number is related to an amount of change



in position of said lever to provide proportional control; and

means for applying said code to said computer.

4,872,673

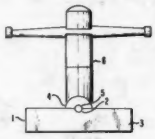
BALANCING BEAM TOY

James L. Hanley, 28 Farmingdale Dr., Parsippany, N.J. 07504

Filed May 27, 1988, Ser. No. 200,077

Int. Cl.[4] A63F *9/00*

U.S. Cl. 273—1 GF **21 Claims**



1. A balance toy comprising a base, a balance beam rotatably mounted on the base and a segmented figurine.

4,872,674

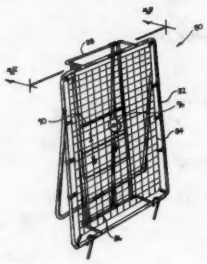
BASEBALL PITCHING PRACTICE DEVICES

Clifton R. Deal, Rte. 1, Box 1321, Blue Ridge, Ga. 30513

Filed Jan. 19, 1988, Ser. No. 145,547

Int. Cl.[4] A63B *69/40*

U.S. Cl. 273—26 A **1 Claim**



1. A new and improved baseball pitching practice device comprising,

backstop frame,

ball receiving net positioned across said backstop frame means, said ball receiving net defining a first target;

a second target adjustable selectively positioned in front of said first target means attaching said second target to said frame; and

third target adjustable positioned in front of said second target, said third target being attached to said frame and being movable relative, said second target and

wherein said net comprises a rebound net designed to effect a rebound of a ball thrown thereagainst and back to an individual who has thrown said ball, and

wherein said second target comprises an adjustable size strike zone, and

wherein said strike zone is defined by movable cross-linked members which define a rectangular shape to thus establish said strike zone, and

wherein said third target comprises a disk supported on a flexible member.

4,872,675

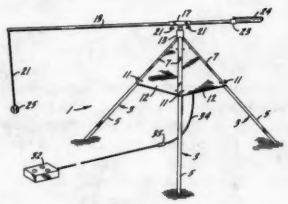
BASEBALL PITCHING DEVICE

Horace Crowden, Rte. 2, Box 12, Sheffield, Ala. 35661

Filed Feb. 17, 1987, Ser. No. 15,641

Int. Cl.[4] A63B *69/38*

U.S. Cl. 273—26 E **16 Claims**



1. An improved baseball pitching device comprising:

a base;

a hollow shaft supported by said base wherein said shaft is capable of rotating with respect to said base;

means for imparting rotation to said shaft;

a clamp adjustably engaged along the length of said shaft;

means securing a ball to said clamp, wherein said means provides an inward force upon said ball in the direction of said base and said means protruding from within said hollow shaft.

4,872,676

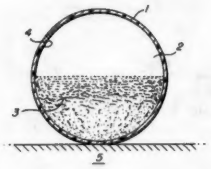
ENERGY ABSORBING BALL

Charles P. Townsend, Claire Road, Kirby Cross, Frinton on Sea, Essex C013 0LX, United Kingdom

Filed Mar. 22, 1988, Ser. No. 171,845

Int. Cl.[4] A63B *39/00, 37/08*

U.S. Cl. 273—58 H **4 Claims**



1. A low-deviation croquet ball comprising a resilient structural outer casing and an energy absorbent core, said core

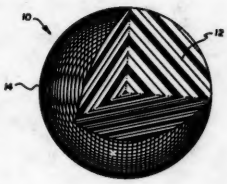
being formed of a non-resilient deformable material adapted on rolling to move relative to the casing, said deformable material consisting by volume of from 40–70% of the core volume, characterized in that the inner face of the outer casing is smooth and in that the deformable material includes a low viscosity liquid and a small amount of surface active agent, thereby to provide an average deviation on striking of less than 0.21 meters per meter run.

4,872,677

CROQUET BALL

Bryan J. Dawson, 1349 South Road, Bedford Park, and Leonard J. Hill, 1 Mindara Court, Belair, both of Australia

Filed Mar. 28, 1988, Ser. No. 174,408
Claims priority, application Australia, Mar. 26, 1987, PI1085
Int. Cl.[4] A63B *37/00*
U.S. Cl. 273—58 A **2 Claims**



1. A croquet ball, comprising:

a one-piece substantially spherical body entirely composed of cold-molded polyurethane including a widely distributed filler which provides said body with a weight of substantially 16 ounces, an external diameter of substantially 3.625 inches and a bounce, when dropped from a height of 60 inches onto a steel plate one inch thick and set rigidly in concrete, when the ambient temperature is 20° C., of:

about 43 inches, when the ball is at 20° C.,

about 43 inches when the ball is at 0° C., and

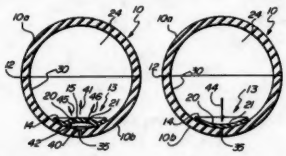
about 35 inches when the ball is at 100° C.

4,872,678

PRESSURIZABLE GAME BALL

Gex B. Coons, 506 Amber Dr., Huntington Beach, Calif. 92648

Filed Oct. 11, 1988, Ser. No. 255,593
Int. Cl.[4] A63B *39/04, 41/00*
U.S. Cl. 273—61 R **7 Claims**



1. A pressurizable bladderless game ball comprising:

a closed ball surface defining an interior cavity, an interior surface, and a wall aperture therethrough; and

a valve member having a flexible raised portion defining a valve aperture and an attachment surface extending therefrom,

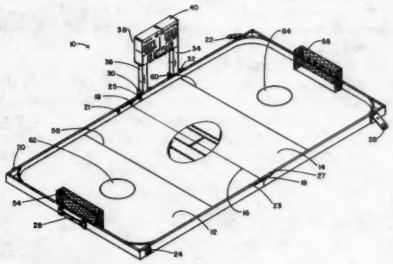
said attachment surface being conformable to and attachable to said interior surface such that said raised portion overlies said wall aperture.

4,872,679

COMBINATION TABLE TOP FOOTBALL AND HOCKEY GAME

Frank L. Bohaski, 34 Penelope St., and Jack L. Horner, Jr., 244 Southern Ave., both of Pittsburg,, Pa. 15211

Filed Dec. 6, 1988, Ser. No. 280,575
Int. Cl.[4] A63F *7/06*
U.S. Cl. 273—85 R **18 Claims**



1. A combination table top football and hockey game, comprising:

a rectangular game board having opposite front and back surfaces, opposite parallel end walls connected by base parallel side walls;

said game board formed by two rectangular sections connected by a hinge along a central line for movement between open and closed positions;

indicia designating a football field game area on said front game board surface;

indicia designating a hockey rink game area on said back game board surface;

latch means for retaining said game board in said closed position;

a pair of spaced aligned scoreboard mounting brackets on a side wall of said rectangular board; and

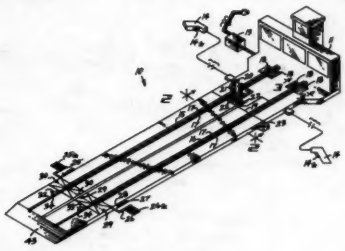
a scoreboard having aligned spaced legs removably received in said mounting brackets, said scoreboard being invertible for usage with said front or said back surface of said game board.

4,872,680

ELECTRIC DRAG STRIP APPARATUS

Willard A. Dennis, P.O. Box 807 Country Club Dr., Johnsonville, S.C. 29555

Filed Dec. 5, 1988, Ser. No. 279,513
Int. Cl.[4] A63F *9/14*
U.S. Cl. 273—86 B **8 Claims**



1. An electrical drag strip apparatus to provide a contest between two individuals, each racing a miniature vehicle, said apparatus comprising,

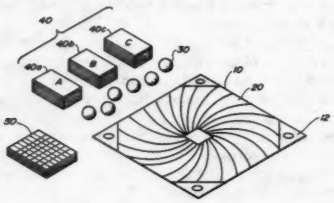
an elongate support platform means including first and second tracks each adapted to accept a downwardly depending shoe secured to each of said two vehicles, and at least one electrical conductor coextensive and parallel to each of said elongate tracks, and

a finish line orthogonally oriented to said first and second tracks and each electrical conductor wherein each electrical conductor terminates at said finish line and each of said first and second tracks extends beyond said finish line to a terminal end of said platform means, and

a starting line orthogonally directed and formed across said first and second tracks rearwardly spaced to and parallel of said finish line with a starting indicator medially positioned of said starting line, and

a pair of spaced troughs associated with each of said first and second tracks with each pair of troughs positioned exteriorly of a respective track and a respective electrical conductor wherein said troughs are positioned and spaced rearwardly of said starting line to accept a fluid within said troughs.

4,872,681
GAME APPARATUS
Michael A. Martin, P.O. Box 626, Fairfax, Calif. 94930
Filed Nov. 30, 1988, Ser. No. 277,754
Int. Cl.[4] A63D *3/00*
U.S. Cl. 273—118 R 2 Claims



1. A game apparatus comprising:

a playing surface having a perimeter, a plurality of corners, a plurality of playing sections, a center area, a boundary extending generally around said perimeter but interior of said corners, a plurality of section dividing lines, each defining a diminishing-radius curve extending from said boundary towards said center area, said section dividing lines dividing said playing surface into a plurality of playing sections, each of said playing sections bearing indicia indicative of a particular play result;

a plurality of question cards each bearing indicia indicative of only one of more than one level of question; and

at least one game piece conditioned for rolling on said playing surface and coming to rest on only one of said playing sections, thus generating a result indicia for that roll.

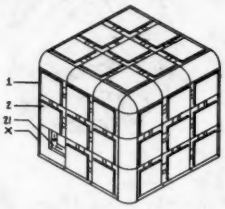
4,872,682
CUBE PUZZLE WITH MOVING FACES
Ravi Kuchimanchi, Dept. of Physics, Univ. of Maryland, College Park, Md. 20742, and Madhukar N. Thakur, Board of Studies in Computer and Information Sciences, Univ. of California, Santa Cruz, Calif. 95064
Filed Nov. 17, 1987, Ser. No. 108,163
Int. Cl.[4] A63F *9/08*
U.S. Cl. 273—153 S 20 Claims

1. A puzzle cube, comprising

an array of cubelets extending in three dimensions to define a base cube with plural faces by respective facelets of said cubelet facelet wherein respective ones of said cubelets define respective sets of planes, the planes of any one of said sets of planes being orthogonal to the planes of each other one of said sets, each said facelet comprising a pair of orthogonal continuous channel segments defined by respective parts of the facelet which extend continuously from respective edges of each facelet to a central area of the facelet, the respective channel segments intersecting in a limited area at the center of each said facelet, said channel segments of all the respective facelets thereby defining a substantially continuous channel network for each said face of said base cube,

internal support means for supporting said cubelets in the form of said base cube, and for allowing the respective cubelets associated with any one of said planes to be rotated as a unit about a respective axis perpendicular to the respective set of planes,

sliders associated with at most all but one of said facelets of said cubelets of said base cube, said sliders having respective engaging parts on the backs thereof for being secured in said channels of the respective facelet and for holding the respective facelet from only its back in said channel segments so that the entire front of the slider is exposed to an operator and constrained to move substantially



smoothly therein and for moving between adjacent facelets via said channel network, each said facelet not having one of said sliders associated therewith being exposed in the respective face of said base cube,

wherein each occurrence of an exposed facelet can be effectively moved around the respective face of said base cube by sliding any one of the next respective sliders along any respective one of said channel segments of said channel network on the same face of the base cube, each said occurence of an exposed facelet can be effectively rotated onto a different one of said faces of said base cube by rotation of at least one respective one of said planes of one of said orthogonal sets thereof with respect to each other of said planes of the same set, and said cubelets with said channel segments of said channel networks, said sliders with said engaging parts, and the number of said sliders are provided so that each said slider is capable of non-rotational, linear motion along each of two directions in each said face, said two directions of linear motion across each said facelet being defined by respective ones of said channel segments.

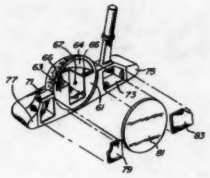
4,872,683
GOLF CLUB PUTTER
Brian A. Doran, Solvang, Calif., and Robert H. Redkey, 1630 Maple, Solvang, Calif. 93463, assignors to Robert H. Redkey, Solvang, Calif.
Division of Ser. No. 66,726, Jun. 25, 1987, Pat. No. 4,809,977.
This application Nov. 22, 1988, Ser. No. 274,913
Int. Cl.[4] A63B *53/04*
U.S. Cl. 273—164 8 Claims

1. A golf putter comprising:

a putter blade;

an alignment means for aligning said putter with a golf ball, said alignment means comprising a substantial section of a

sphere the size of a golf ball centrally located on said putter blade, said section being hollow in part; and



weighting means comprising a first heel weight and a first toe weight disposed within said section and on opposite sides of a space therebetween.

4,872,684

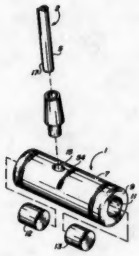
GOLF PUTTER

Stephanie A. Dippel, 8787 E. Mountain View #2010, Scottsdale, Ariz. 85258

Continuation-in-part of Ser. No. 115,413, Nov. 2, 1987. This application Dec. 23, 1988, Ser. No. 289,610

Int. Cl.[4] A63B *53/04*

U.S. Cl. 273—164 **20 Claims**



1. A golf putter comprising:

(A) a generally cylindrical club head, said club head including:

1. a main body portion fabricated from acetal resin, said main body portion having:
   a. a heel end and a toe end;
   b. a first weight-receiving receptacle recessed in said heel end;
   c. a second weight-receiving receptacle recessed in said toe end; and
   d. a shaft-end-receiving aperture extending from an outer periphery surface of said main body portion and terminating at a position within said main body portion;
2. a first weight insert residing in said first weight-receiving receptacle, said first weight insert being characterized as having a higher weight-per-volume ratio than said plastic material; and
3. a second weight insert residing in said second weight-receiving receptacle, said second weight insert being characterized as having a higher weight-per-volume ratio than said plastic material;

(B) a shaft including:

1 a grip end;
2. an elongated intermediate section; and
3. a club head end, said club head end having a terminal portion dimensioned and configured to be closely received within said shaft-end-receiving aperture; and

(C) joining means for securely fixing said terminal portion of said club head end of said shaft in said shaft-end-receiving aperture.

4,872,685

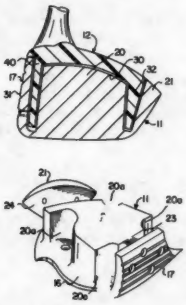
GOLF CLUB HEAD WITH IMPACT INSERT MEMBER

Donald J. C. Sun, 4521 Ocean Valley La., San Diego, Calif. 92130

Filed Nov. 14, 1988, Ser. No. 270,508

Int. Cl.[4] A63B *53/04*

U.S. Cl. 273—169 **6 Claims**



1. A golf club head comprising:

a male unit which includes a sole plate for said head, a face plate for said head extending normally from the sole plate, a back weight element extending normally from said sole plate and a central weight element having outer walls extending normally from said sole plate and located between the face plate and back weight element, there being a first slot formed between the central weight element and said back weight element and a second slot formed between the central weight element and said face plate;

a female unit forming the outer body of said club head and including a central hollow portion for receiving the central weight element of the male unit, said hollow portion being formed by a pair of opposing front and rear walls and a pair of opposing side walls, said front wall having an outer surface with an undercut portion for receiving the face plate;

said male and female units being joined together in mating relationship to form an integral assembly with the central weight element of said male unit in mating engagement within the hollow portion of the female unit, the face plate being fitted within the undercut portion of the female unit and abutting against said front wall and the back weight element abutting against the rear wall of said female unit.

4,872,686

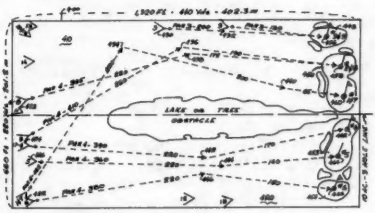
GOLF COURSE AND METHOD OF PLAYING A GOLF GAME

Theodore W. Trasko, 15370 Transit Ct., Unit 106, North Fort Myers, Fla. 33903

Continuation of Ser. No. 742,092, Jun. 6, 1985, abandoned. This application Sep. 23, 1987, Ser. No. 102,783

Int. Cl.[4] A63B *67/02*

U.S. Cl. 273—176 AB **9 Claims**



1. A substantially rectangular golf course for playing three holes simultaneously and comprising:

a pair of opposite ends and a pair of sides extending between said opposite ends;
a first plurality of greens comprising three holes;
each of said greens in said first plurality comprising at least one hole;
a first plurality of tee areas each comprising means for playing a respective one of said holes in the first plurality of greens;
said three holes in said first plurality of greens being arranged relatively close to one another so that the longest distance between adjacent holes is relatively small compared to the shortest distance between any of said three holes and its corresponding tee area;
a second plurality of greens comprising three holes;
each green in said second plurality of greens comprising at least one hole;
a second plurality of tee areas each comprising means for playing a respective one of said holes in the second plurality of greens;
said three holes in the second plurality of greens being arranged relatively close to one another so that the longest distance between adjacent holes is relatively small compared to the shortest distance between any of said three holes and its corresponding tee area;
at least one of said holes in each plurality of greens being located relatively close to one of said opposite ends;
all of said holes in each plurality of greens being located relatively remote from the other opposite end;
at least one tee area in each plurality of tee areas being located relatively close to the other opposite end;
all of said tee areas in each plurality of tee areas being located between said ends and relatively remote from said one end;
each green in said first plurality of greens being outside the area between any other green in said first plurality of greens and any of said first plurality of tee areas;
all of the tee areas in said first and second plurality of tee areas being outside of the area between any two greens in said first plurality of greens;
each green in said second plurality of greens being outside the area between any other green in said second plurality of greens and any of said second plurality of tee areas;
all of the tee areas in said first and second plurality of tee areas being outside of the area between any two greens in said second plurality of greens;
a first plurality of fairways located between said first plurality of tee areas and said first plurality of greens;
and a second plurality of fairways located between said second plurality of tee areas and said second plurality of greens;
said first and second pluralities of greens, tees and fairways being located on a pair of substantially rectangular cores disposed in adjacent, substantially side-by-side, non-diverging relation;
all of the relatively closely arranged plurality of holes in said golf course being located, as a group, other than along a side of said golf course;
all of the tee areas, for playing any plurality of relatively closely arranged holes, being located, as a group, other than both (1) along a side of the golf course and (2) at a location across from holes on the opposite side.

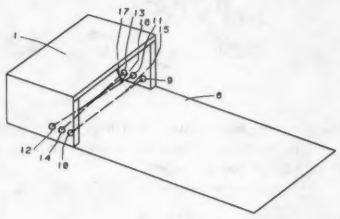
4,872,687

PUTTING TUTOR

Daniel J. Dooley, 112 Carriage Way - A110, Burr Ridge, Ill.

Filed Jul. 23, 1987, Ser. No. 76,877
Int. Cl.[4] A63B *69/36*; G01P *3/36*
U.S. Cl. 273—185 R **22 Claims**

1. A device for diagnosing movement of a ball which is struck in a starting region to roll over a support surface and to cross first, second and third reference lines adjacent said surface, said first and second reference lines being sequentially crossed by the ball and being parallel to each other and perpendicular to a reference path and said third reference being at an acute angle relative to said reference path, said device comprising: first detector means for generating a first electrical signal as the ball crosses said first detection line; second detector means for generating a second electrical signal as the projectile crosses said second detection line; third detector means for



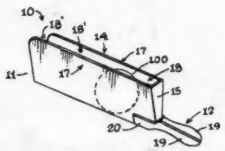
generating a third electrical signal as the projectile crosses said third detection line; circuit means for processing said first, second and third electrical signals for developing indicating signals which indicate the speed and path of rolling movement of the ball over said support surface, and indicating means responsive to said indicating signals.

4,872,688

DISC LAUNCHING AND CATCHING APPARATUS

Irving H. Galvin, 18895 SW. 84 Rd. Pl., Bldg. 12-#14, Miami, Fla. 33157

Filed Feb. 27, 1989, Ser. No. 315,644
Int. Cl.[4] A63B *65/10*
U.S. Cl. 273—326 **5 Claims**



1. A disc catching and launching apparatus for use in combination with an aerodynamic disc wherein the apparatus comprises:
a catching and release unit including a generally elongated narrow scoop member having opposed generally flexible side wall portions which define the scoop mouth opening;
a handle unit comprising a pair of spaced handle members wherein each handle member is provided with an inboard end which is operatively attached to one of the said side wall portions of the said scoop member.

4,872,689

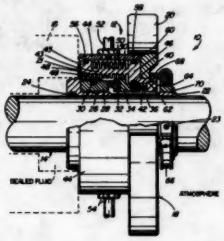
MECHANICAL SEAL WITH HEAT EXCHANGER

Kevin R. Drumm, Markham, Canada, assignor to Nuraseal Co. Ltd., Canada

Filed Apr. 22, 1987, Ser. No. 41,144
Claims priority, application Canada, Dec. 12, 1986, 525130
Int. Cl.[4] F16J *15/34, 15/54*; F28F *1/42*
U.S. Cl. 277—9.5 **13 Claims**

8. A heat exchanger for a seal assembly comprising:
a hollow annular body adapted to be mounted to the seal assembly in surrounding, radially spaced relation to a pair of annular sealing members of the seal assembly to transmit heat energy toward or away from them, fluid inlet and outlet means on said body for passage of heat transfer

medium therethrough; said annular body having inner and outer radially spaced cylindrical walls joined by end walls, said radially inner wall having a radially innermost major surface and a radially outmost major surface with ribs extending on at least the radially innermost major



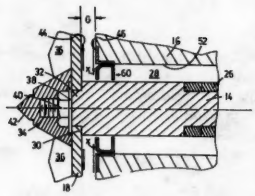
surface to provide enhanced heat transfer while assisting in inhibiting the flow of fluid into and out of an annular zone which exists, in use, between said radially inner wall of the heat exchanger and the radially outer surfaces of the annular sealing members.

4,872,690

SEAL CAVITY PROTECTOR

Joseph R. Dunford, Waverley, Canada, assignor to Enviroseal Engineering Products Ltd., Waverly, Canada

Filed Sep. 9, 1988, Ser. No. 242,174
Int. Cl.[4] F16J *15/00*
U.S. Cl. 277—24 21 Claims



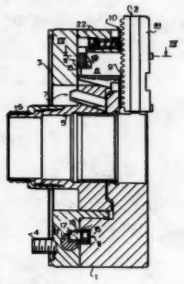
1. A seal cavity protector for use with rotary fluid equipment a seal cavity of which is defined by a rotary shaft, a shaft housing and seal means engaging the shaft, said protector comprising an annular generally cup-shaped element adapted to pass the shaft therethrough and to be secured to the housing at the entrance to the seal cavity, said element including a plurality of circumferentially spaced apart, generally tangentially directed, first vent passages extending through the wall thereof whereby, with the protector in place and as the equipment rotates, a low pressure area is created adjacent said element outside the seal cavity and fluid within the seal cavity is drawn therefrom through the vent passages.

4,872,691

LATHE CHUCK

Günter H. Röhm, Heinrich-Röhm-Strasse 50, D-7927 Sontheim, Fed. Rep. of Germany

Filed Jul. 29, 1988, Ser. No. 226,325
Claims priority, application Fed. Rep. of Germany, Aug. 12, 1987, 3726773
Int. Cl.[4] B23B *31/16*
U.S. Cl. 279—123 11 Claims



1. A lathe chuck which comprises:
a chuck body;
a multiplicity of chuck jaws located radially to the axis of said chuck body, two jaw segments making up each of said chuck jaws, said jaw segments lying one behind the other in relation to said axis, said jaw segments being displaceable with respect to one another to change the clamping span of said chuck, said displacements being always less than the maximum possible stroke of the chuck jaws;
a coupling member arranged to enable coupling and decoupling of said two jaw segments;
a actuating member axial to said chuck and displaceable to the maximum possible stroke of the chuck jaws, said actuating member being operatively linked to each of the rearward members of said jaw segments;
a positioning assembly for positioning said coupling member between two limiting positions corresponding to the coupled and decoupled condition of said jaw segments; and
a latching assembly for fixing the forward of said jaw segments in respect to said chuck, said latching assembly, said actuating member for said jaws, and said positioning assembly being controllable cooperatively so that said actuating member executes a back-and-forth motion with a stroke the distance of which corresponds to the distance that said rearward jaw segment must move to make possible the coupling of the two said jaw segments, so that thereby said coupling member is, in one of the directions of said stroke, coupled and, in the other direction of said stroke, uncoupled, and during said stroke while the coupling member is uncoupled, said forward jaw segment is fixed to said chuck body.

4,872,692

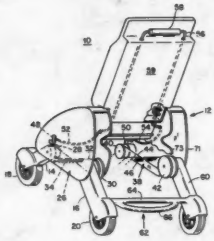
CONVERTIBLE CARRIAGE WITH BIASED WHEEL RETRACTION

Kip V. Steenburg, Sudbury, Mass., assignor to Prodigy Corp., Concord, Mass.

Filed Jun. 3, 1988, Ser. No. 202,720
Int. Cl.[4] B62B *11/00*
U.S. Cl. 280—30 4 Claims

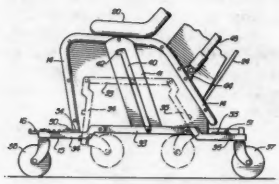
1. A convertible carriage with biased wheel retraction, comprising:
a superstructure including seat means for carrying a person to be transported;

a plurality of wheel means;
a plurality of leg members pivotably interconnected with said superstructure for rollably supporting said wheel means to transport said superstructure when said leg members are in an extended position;
drive means for relocating said leg members between a retracted position and said extended position, including first drive means for moving at least one of said leg members to said extended position, and second drive means for interconnecting the remaining leg members and said first drive means to drive the remaining leg members to said extended position, said first and second drive means respectively including first and second pulley means, each



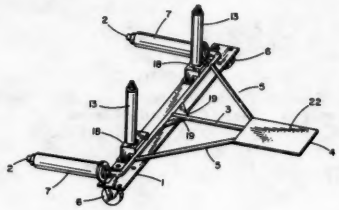
said pulley means being operatively connected to at least one leg member, and said second drive means further including cable means interconnecting said first and second pulley means to drive said pulley means and their corresponding leg members concurrently;
biasing means, connected to said drive means, for driving said leg members to said retracted position, said drive means loading said biasing means when said leg members are driven to said extended position, including spring means connected between said cable means and said superstructure; and
means for locking said leg members in said extended position to inhibit retraction by said biasing means.

4,872,693
COMBINATION INFANT SEAT AND STROLLER
Gordon Kennel, P.O. Box 1110, Havre, Mont. 59501
Continuation of Ser. No. 6,491, Jan. 23, 1987, abandoned. This application Sep. 7, 1988, Ser. No. 241,764
Int. Cl.[4] B62B *7/10*
U.S. Cl. 280—30 **8 Claims**



1. A combination infant seat-stroller apparatus comprising:
(a) a frame assembly having opposing upstanding hollow side panels and at least one supporting cross member;
(b) an infant body support shell having back and seat portions secured to the frame assembly between the opposing upstanding side panels;
(c) a pair of articulated wheel assemblies, each wheel assembly being retractable within one of said opposing upstanding side panels of the frame assembly and having a central element, a pair of elongated extension elements each pivotally mounted on one end thereof to opposing ends of the central element and a wheel mounted on the free end of each of such extension element; and
(d) separate means to vertically move each articulated wheel assembly to a first upper position within one of the opposing upstanding side panels wherein the extension elements are pivoted inwardly toward one another in a vertical orientation with the wheels positioned out of the way above the lower edge of the frame assembly so the apparatus may be used as an infant seat and to a second lower position wherein the extension elements may be pivoted outwardly away from one another to extend laterally from the central element with the wheels in an operative position below the lower edge of the frame assembly and fore and aft of the opposing side panels so the apparatus may be used as a stroller.

4,872,694
TRUCK TIRE MOUNTING DEVICE
William B. Griesinger, Rte. 1, Box 76, Monee, Ill. 60449, assignor to William B. Griesinger, Monee, Ill.
Filed Aug. 17, 1988, Ser. No. 195,656
Int. Cl.[4] B62B *1/14*
U.S. Cl. 280—79.4 **1 Claim**



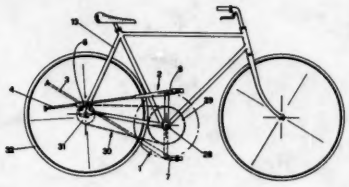
1. A truck wheel mounting device comprising:
a laterally extending main-frame plate supported by each end by a caster assembly;
two horizontally protruding parallel roller assemblies, each one of which extends forwardly from each end of said main-frame plate;
two vertical parallel roller assemblies extending normal to said main-frame plate;
a horizontal foot activated lever extending rearwardly from the main-frame plate;
a first reinforcing bar having one end connected to a first end of said main-frame plate and the other end connected to said foot activated lever to define an apex;
a second reinforcing bar having one end connected to a second end of said main-frame plate and the other end connected to said foot activated lever at said apex;
a foot plate mounted at said apex;
and the length of said foot activated lever is relatively longer than the height of said caster assemblies thereby forming a lever action by pushing the foot plate down and raising the horizontal roller assemblies with the caster assemblies comprising a fulcrom point.

4,872,695

TORQUE-MULTIPLYING KINEMATIC DEVICE PARTICULARLY FOR BICYCLES AND BICYCLES EMPLOYING SAID KINEMATIC DEVICE

Tomba Silvano, and Giuseppe Tomba, both of Montecchio Maggiore, Italy, assignors to Brai Systems SRL, Vicenza, Italy

Filed Mar. 29, 1988, Ser. No. 174,968
Claims priority, application Italy, Apr. 3, 1987, 85527 A/87
Int. Cl.[4] 262M *1/02, 1/04*
U.S. Cl. 280—257 **7 Claims**



1. A torque-multiplying kinematic device, particularly adapted for use on bicycles, comprising:

a pair of rods, each of said rods having an intermediate angled junction dividing said rod into a foremost portion and a rearmost portion, said foremost portion being inclined at one angle upwardly relative to said rearmost portion, each said junction of each said rod having at least one junction aperture in the vicinity of said junction of said foremost and rearmost portions, and each said foremost portion having an end aperture near the end opposite said junction, said end aperture being adapted to mount a pedal of a bicycle;

a pair of pivot means, one of said pivot means being adapted to be inserted into one of said junction apertures of each of said rods for fastening each of said rods to a crank of a bicycle; and

a pair of guiding supports, each of said guiding supports corresponding in slideable relationship with one of said rods via said rearmost portion of said rod, and each of said guiding supports being adapted to be fastened to a back fork of a bicycle so that each of said guiding supports rotates about an axis substantially parallel to the rotational axis of a wheel mounted between the back fork of a bicycle;

wherein where the foremost of one of said rods is in a substantially horizontal position at a bottom dead center of said crank, a maximum additive torque is produced and a minimum clearance above ground surface sufficient to avoid ground surface engagement is obtained.

4,872,696

REMOTE RELEASE SADDLE POST CLAMP

G. Herbert Gill, 206 Russell St., Winters, Yolo C., Calif. 95654

Filed May 27, 1988, Ser. No. 199,422
Int. Cl.[4] B62K *3/14*
U.S. Cl. 280—281.1 **6 Claims**

1. A remotely operable clamp for a bicycle saddle post where the said saddle post is inserted into the top of an essentially vertical down tube comprising a portion of the frame of said bicycle,

(a) said top of said downtube having a slot therein, parallel to the axis of said downtube,

(b) a first and a second essentially rectangular block attached rigidly to the opposite sides of said slot near to the top of said downtube,

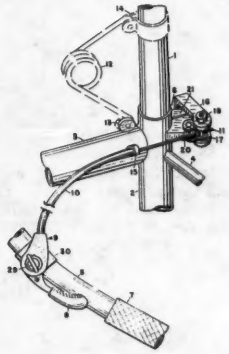
(c) said blocks being perpendicular to said slot, and coplanar to each other,

(d) two short levers having one end of each pivoted coaxially on the first of said blocks with the ends opposite to the pivots extending beyond the edge of said first block,

(e) a long lever having one end pivoted on said second block, having two projections on the opposite end overlapping both of said extending ends of said short levers ,

(f) a pivot bolt passing through said extending ends of both of said short levers, and through both of said projections of said long lever, whereby all said levers are rotatably connected together,

(g) said pivot bolt having an operating means attached thereto approximately centered between the said two



short levers, whereby movement of said operating means moves said pivot bolt rotationally in an arc about the said pivots of said short and said long levers,

(h) a first stop to limit the rotational movement of said levers in one direction,

(i) a second stop to limit the rotational movement of said levers in another direction,

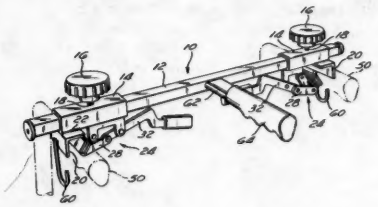
(j) said operating means being operatively connected to a hand lever located on said bicycle frame.

4,872,697

ADAPTOR HANDLE

Gerard Berkowitz, 33 Highbury Street, Prospect, Australia

Filed Nov. 1, 1988, Ser. No. 265,484
Int. Cl.[4] B62B *3/00*
U.S. Cl. 280—304.5 **9 Claims**



1. An adaptor handle for wheeled vehicles and the like having a pair of rearwardly extending spaced-apart handles for application of propulsion forces and steering comprising:

an elongate arm member sized to extend across the pair of spaced-apart handles of the vehicle;

an over-center latch mounted adjacent opposite ends of said arm member for releasably clamping said arm member to said pair of handles of the vehicle;

a hand grip centrally mounted to said arm member and extending rearwardly therefrom adapted to be grasped in the hand of a user; and

means carried on said over-center latch for allowing said

over-center latch to accommodate differing sized handles of the vehicles, said allowing means comprising:

a first plate member affixed to said over-center latch;

a second plate member removably mounted to said first plate member; and

plural spacers removably mounted between said first and second plate members.

4,872,698

SKI BRAKE ASSOCIATED WITH A SKI BINDING

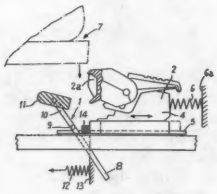
Pierre Szafranski, Annecy Le Vieux, France, assignor to Salomon, S.A., Annecy Cedex, France

Filed Feb. 1, 1988, Ser. No. 151,277

Claims priority, application France, Feb. 3, 1987, 87 01278

Int. Cl.[4] A63C *7/10*

U.S. Cl. 280—605 **24 Claims**



1. An associated heel binding-ski brake assembly which comprises:

(a) a binding body which is longitudinally slidable on a track to be affixed to a ski, said binding body being forwardly biased by a retraction spring; and

(b) a ski brake comprising at least one projection pivotable around a substantially horizontal transverse axis between an active position and an inactive position, means for elastically biasing said at least one projection to said active position to activate said brake, and means for reducing the biasing force exerted by said elastically biasing means on said at least one projection of said ski brake in response to rearward movement of said binding body.

4,872,699

APPARATUS AND METHOD FOR ADJUSTING CAMBER AND TOE

Clinton E. Grove, and Robert D. Grove, both of R.R. 2, Elbow Lake, Minn. 56531

Filed Apr. 29, 1988, Ser. No. 188,280

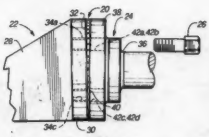
Int. Cl.[4] B62D *17/00*

U.S. Cl. 280—661 **20 Claims**

1. A shim for use in adjusting the camber and toe of a wheel comprising:

a tapered shim hub having a periphery; and

a plurality of outwardly extending tabs operably, removably coupled to the periphery of said shim hub, said tabs varying radially in thickness around said periphery in accordance with the taper of said shim hub such that said tabs and shim hub together define a shim angle.



4,872,700

SELF-PROPELLED VEHICLE HAVING BOGIE-TYPE RUNNING GEAR

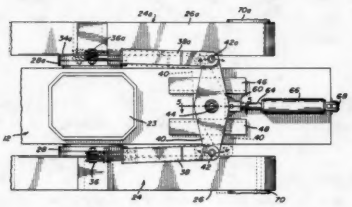
Per-Gustaf Mellgren, Kirkland, Canada, assignor to Forest Engineering Research Institute of Canada, Pointe Claire, Canada

Filed Aug. 22, 1988, Ser. No. 234,747

Claims priority, application Canada, Jan. 26, 1988, 557369

Int. Cl.[4] B60G *19/02*

U.S. Cl. 280—677 **6 Claims**



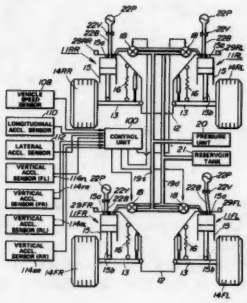
1. A self-propelled vehicle having a single chassis, bogie means mounted on each side of the chassis including a pair of parallel walking beams, one on either side of the chassis and each pivotally mounted to shaft means on the chassis having a common transverse axis, wheel means rotatably mounted at each end of the walking beams, a first arm fixedly mounted to each walking beam and extending upwardly from the walking beam, a rocking beam pivotally mounted about a vertical axis to the chassis, link means connecting each first arm to a respective end of the rocking beam such that vertical displacement of a wheel means results in an opposite displacement of a corresponding wheel means on the other walking beam.

4,872,701

ACITIVELY CONTROLLED AUTOMOTIVE SUSPENSION SYSTEM WITH ADJUSTABLE RESPONSE CHARACTERISTICS IN PITCHING-SUPPRESSIVE CONTROL

Yohsuke Akatsu; Naoto Fukushima; Yukio Fukunaga; Sunao Hano, and Masaharu Satoh, all of Kanagawa, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Mar. 24, 1988, Ser. No. 172,419
Claims priority, application Japan, Mar. 24, 1987, 62-69898
Int. Cl.[4] B603 *3/00*
U.S. Cl. 280—703 **14 Claims**



1. A pitching-suppressive suspension control system for an automotive vehicle comprising:

a suspension system disposed between a vehicle body and a suspension member which rotatably supports a vehicular wheel, said suspension system having a variable pressure chamber filled with a working fluid of controlled pressure;

a pressure adjusting means, associated with said variable pressure chamber, for adjusting the pressure of said working fluid in said pressure chamber;

a sensor means for monitoring a magnitude of energy of vehicular pitching direction exerted on the vehicle to produce a pitching magnitude indicative signal; and

a control unit receiving said pitching magnitude indicative signal, and producing a pitching-suppressive suspension control signal based on said pitching magnitude indicative signal and a variable pitching-suppressive suspension control coefficient to control said pressure adjusting means for adjusting suspension characteristics to suppress vehicular pitching, said control unit adjusting said pitching-suppressive suspension control coefficient depending on said pitching magnitude indicative signal value for adjusting response characteristics relative to pitching magnitude.

4,872,702

SUSPENSION SYSTEM FOR VEHICLES

Jackson C. Medley, Brimfield, Ill., assignor to Kress Corporation, Brimfield, Ill.

Filed Aug. 23, 1988, Ser. No. 235,109
Int. Cl.[4] B60G *11/26*
U.S. Cl. 280—708 **8 Claims**

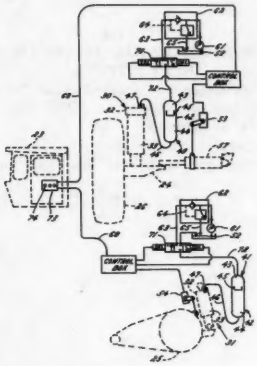
1. A suspension assembly for a vehicle having a chassis and at least one wheel axle comprising, in combination:

a strut having a first cylinder section and second piston section, said first and second sections being fitted for telescoping movement in relation to each other to form first and second chambers therein, said first strut chamber being filled with a gas, said second strut chamber being filled with a liquid, and a means for separating said chambers;

a cylinder having a first cylinder chamber filled with a liquid, a second cylinder chamber filled with a gas, and a movable means for separating the chambers within the cylinder;

a source of liquid under pressure, a first connection from the source of liquid to the first cylinder chamber, and a valve means for controlling the supply of liquid from the source of liquid to the first cylinder chamber to permit adjustment of the volume of liquid in the cylinder;

a second connection from the second cylinder chamber to the first strut chamber, said second connection including



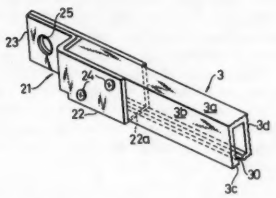
an orifice, the orifice being sized to regulate a flow of gas from the chamber containing gas at a higher pressure to the chamber containing gas at a lower pressure, the gas flow between chambers occurring at a substantially constant rate when the gas pressure in the chamber containing the higher pressure gas exceeds a predetermined value such that the dynamic stiffness characteristic of the strut is a function of the speed of the movement of the axle relative to the vehicle.

4,872,703

PASSIVE SEAT BELT SYSTEM

Hiroyuki Saito, Chigasaki, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 22, 1987, Ser. No. 111,262
Claims priority, application Japan, Oct. 25, 1986, 61-162922
Int. Cl.[4] B60R *21/02*
U.S. Cl. 280—804 **22 Claims**



1. A passive seat belt system comprising:

a guide rail having an elongated top wall, an elongated bottom wall and two elongated side walls extending spacedly between the top and bottom walls and defining a slot longitudinally in the bottom wall;

a movable member extending through the slot formed in the guide rail and connected to an associated occupant restraining webbing; and

a bracket provided at one end portion of the guide rail and adapted to mount the guide rail on a stationary base, said bracket being formed of a plate-like material and including a rail-holding portion, which encloses externally said one end portion of the guide rail so as to maintain said rail-holding portion in contact with a portion of at least three of the top wall, side walls and bottom wall of the guide rail, and an extension extending out further longitudinally from the rail-holding portion and defining a mounting bore only at the extension for mounting the bracket on the stationary base.

4,872,704

DEVICE FOR HEIGHT ADJUSTMENT OF A SAFETY BELT FITTING

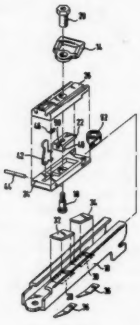
Dieter Biller, Mutlangen, and Joachim Biller, Leinzell, both of Fed. Rep. of Germany, assignors to TRW Repa GmbH, Alfdorf, Fed. Rep. of Germany

Filed Jul. 29, 1988, Ser. No. 226,051

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1987, 3733026

Int. Cl.[4] B60R *22/20*

U.S. Cl. 280—808 **9 Claims**



1. A device for the height adjustment of a safety belt fitting in motor vehicles, comprising a load-receiving guide rail adapted to be mounted in a vehicle, an anchoring element which is displaceably accommodated in said guide rail and to which said safety belt fitting is secured, a detent means comprising a plurality of pawl members spaced apart in the longitudinal direction of said guide rail which pawl members are movable against spring force out of a normal locking position into a release position, a latch element on said anchoring element cooperating with said pawl members for locking engagement therewith, and a release element for releasing the locking between said latch element and said pawl members in an actuated state thereof, said release element being mounted on said anchoring element and having a blocking extension which in the actuated state of said release element and upon downward displacement of said anchoring element engages the first pawl member encountered on said downward movement to stop downward displacement of said anchoring element, said pawl members when in said release position being located out of the path of movement of said blocking extension.

4,872,705

CONFIDENTIAL POST CARD

Guenther Hartfeil, Dayton, Ohio, assignor to Charles Jones, Dayton, Ohio, a part interest

Filed Aug. 8, 1988, Ser. No. 229,687

Int. Cl.[4] B42D *15/00, 15/04, 15/02;* **G09F** *3/00*

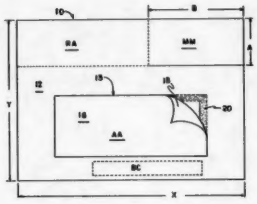
U.S. Cl. 283—67 **12 Claims**

1. A post card for sending confidential data in the form of decipherable indicia from a sender to a recipient who may legitimately share information conveyed by the indicia, comprising

a stiff rectangular card body measuring no less than 3.5 inches by 5 inches,

said body having a face onto which postage and at least a recipient's address are to be applied and a sender's return address may be applied,

said face of said body having a predetermined area within which area confidential indicia may be located;



an opaque label having an exposed surface and a reverse surface securable to said card body and covering said predetermined area;

said label functioning to conceal confidential indicia placed at the interface of said body and said reverse surface of said label; and

means securing said label to said card body in such manner that tampering with said label will be detectable by the recipient,

said label having on its said exposed surface at least one address.

4,872,706

POSTAGE AD LABELS

Ronnie M. Brewen, Houston, and David A. Lloyd, Conroe, both of Tex., assignors to American Stamp, Inc., Houston, Tex.

Continuation of Ser. No. 862,757, May 13, 1986, abandoned. This application Mar. 2, 1988, Ser. No. 166,754

Int. Cl.[4] B42D *15/00;* **B42F** *5/02;* **B65D** *27/00*

U.S. Cl. 283—81 **14 Claims**

1. A label assembly comprising:

a label having a print side and an adhesive side;

postage affixed on said print side of said label;

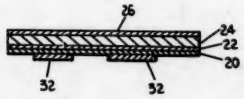
a backing member having a first side for releasably engaging said adhesive side of said label.

4,872,707

LABEL OR TICKET

Frank G. deBruin, Grand Rapids, Mich., assignor to Grand Rapids Label Company, Grand Rapids, Mich.

Continuation of Ser. No. 588,047, Mar. 9, 1984, Pat. No. 4,724,166. This application Nov. 17, 1987, Ser. No. 121,606
The portion of the term of this patent subsequent to Feb. 9, 2005, has been disclaimed.
Int. Cl.[4] B42D *15/00*; B32B *31/00*; B05D *1/32*; D06N *7/04*
U.S. Cl. 283—102 8 Claims



1. A coupon or ticket comprising:

a sheet of stock material having a first dry substantially continuous coating layer of a material selected from the group consisting of polyamide varnishes, acrylic ester varnishes and wax composition covering a surface of said sheet and a second coating lager of a dry substantially continuous varnish covering at least a portion of said first coating layer;

said first dry coating layer and said second dry coating layer being substantially incompatible with each other so that the first and second coating layers separate from each other by rubbing or pulling apart, and said second coating layer being free from any sheet material covering the same;

a layer of printing on said surface of said sheet beneath said first dry coating;

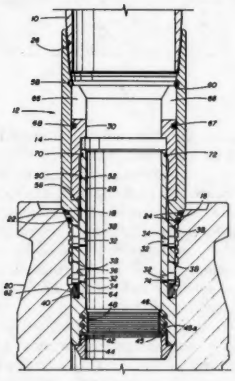
at least portions of said second coating lager being opaque pigmented and covering at least portions of said first coating layer, said pigmented second coating layer being removable from said at least portions of said first coating by rubbing to expose said printed layer therebeneath.

4,872,708

PRODUCTION TIEBACK CONNECTOR

William A. Abreo, Jr., Houston, Tex., assignor to Cameron Iron Works USA, Inc., Houston, Tex.

Filed May 18, 1987, Ser. No. 51,842
Int. Cl.[4] F16L *37/08*
U.S. Cl. 285—39 6 Claims



1. A subsea wellhead comprising

a wellhead housing having an upper tapered seat and internal groove below such seat,

a tie back connector having an annular body with an external downwardly facing shoulder sized to be landed on said housing seat and an internal upwardly facing shoulder,

a sleeve positioned within said annular body and having an external upwardly facing shoulder, upper external threads and means preventing rotation of said sleeve within said annular body,

a locking ring carried by said external sleeve shoulder,

said annular body having a lower end with a lower outer tapered surface which tapers upwardly and outwardly,

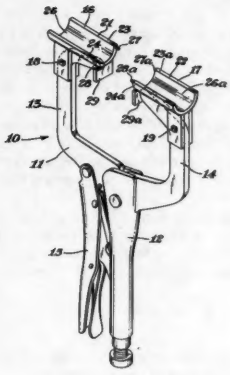
an actuator ring threaded onto said sleeve external threads and engaging said annular body internal shoulder whereby rotation of said actuator ring raises said sleeve to raise said locking ring into surrounding relationship to said lower annular body end and thus wedge said locking ring outward to set said locking ring into said housing internal groove and continued rotation of said actuator ring tensions said sleeve to preload the engagement between said wellhead housing seat and said body shoulder.

4,872,709

PIPE ALIGNING APPARATUS

Eugene V. Stack, Bay City, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed May 2, 1983, Ser. No. 490,939
Int. Cl.[4] F16L *55/00*
U.S. Cl. 285—39 3 Claims

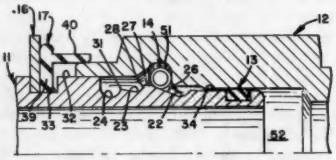


1. A pipe clamp and pipe aligning means comprising a clamp operated with toggle action having first and second opposed jaws at least one of which is pivotally attached to the clamp, the opposed jaws each being bifurcated to provide first and second jaw portions defining therebetween a pipe receiving recess, the jaw portions defining pipe receiving recesses each having an opposed end face with at least two flange or ring engaging portions extending from such end face and substantially normal to the end face, and further, extending towards the opposed end face of the other jaw portion, the projections being positioned to engage a ring or flange on closing of the clamp at generally diametrically opposed locations, on closing of the clamp the recesses being coaxially disposed, said locations lying in the plane normal to a plane formed by the arc made on closing the pivotally attached jaw of the clamp.

4,872,710
RELEASABLE QUICK CONNECT FITTING

James W. Konecny, Fort Worth; Rodney L. Huston, Springtown, and Gerrard N. Vyse, Bedford, all of Tex., assignors to Stratoflex, Inc., Fort Worth, Tex.

Continuation of Ser. No. 932,515, Nov. 20, 1986, abandoned.
This application Oct. 7, 1988, Ser. No. 256,156
Int. Cl.[4] F16L *37/22*
U.S. Cl. 285—81 17 Claims



1. A releasable quick-connect fitting, comprising

(a) a tubular insert having an axis, and having an annular lock groove and an annular release groove in the outer periphery thereof, said lock groove having a forward side which is slanted outwardly and forwardly relative to said axis, and said release groove having a smaller diameter than said lock groove,

(b) a cylindrical receptacle coaxial with said insert and having a bore for receiving said insert and having an annular bore groove in said bore, said bore groove having a rearward side which is slanted inwardly and rearwardly relative to the axis of said receptacle,

(c) an annular retainer mounted in one of said lock and release grooves and movable to the other of said lock and release grooves, said retainer comprising a garter spring formed by substantially circular radially extending closely adjacent coils,

(d) said insert being movable to a lock position in said receptacle wherein said lock and bore grooves are substantially in radial alignment and said retainer extends into said lock and bore grooves, and is wedged between said slanted forward and rearward sides of said grooves and prevents separation of said insert and said receptacle, and said retainer being movable to a release position in said receptacle wherein said release and bore grooves are substantially in radial alignment and said retainer extends into said release groove and is out of engagement with said receptacle, and

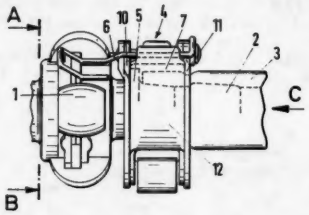
(e) a stop removably connected to one of said insert and receptacle and engageable with the other, said stop preventing movement of said insert to said release position but enabling movement to said release position when removed.

4,872,711
DEVICE FOR CONNECTING A HOSE END TO A CONNECTING SPIGOT

Karl Weinhold, Im Jagdfeld 43,, D-4040 Neuss 1, Fed. Rep. of Germany

Filed Jul. 14, 1988, Ser. No. 219,471
Claims priority, application Fed. Rep. of Germany, Jul. 28, 1987, 3724886
Int. Cl.[4] F16L *33/12*
U.S. Cl. 285—88 3 Claims

1. In an apparatus for connecting a hose end to a connecting spigot in the form of one half of a dog clutch on which a hose socket is formed, on to which the hose end is slipped and clamped, and which is enclosed by a clamp formed by at least two part shells and has a tension lever closure whose tension lever is hinged to a part shell and whose spring connects the tension lever releasably to the other part shell, the device having formed on the connecting spigot an annular collar engaged over by retaining flanges on one side of the part shells, while the clamping flanges forcing those hose against the socket are provided on the other side of the part shells, the retaining flanges being of dimensions such that the clamp is prevented from being pulled off axially of the socket even when the tension lever closure is opened, the clamp having a pivot pin with a shank, the dog clutch having clutch halves provides with cams, the improvement comprising:

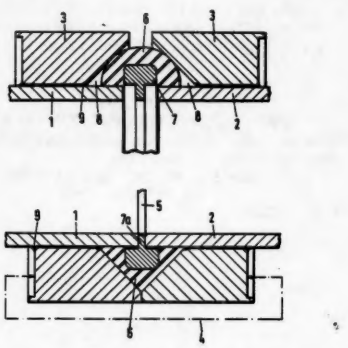


a U-shaped bent wire member (6) which non-rotatably connects the clamp (4) to the connecting spigot (1), the U-shaped bent wire member (6) having a web (6*a*) bent to form an eyelet (6*b*) which positively engages around the shank of the pivot pin (8) of the clamp (4), the U-shaped bent wire member having arms (6*c*) which enclose one of said said cams of said dog clutch half.

4,872,712
FLANGE CONNECTION

Hans P. Maier, Schwenningen, Fed. Rep. of Germany, assignor to Agintec AG, Pfaffikon, Switzerland

Division of Ser. No. 896,646, Aug. 15, 1986, Pat. No. 4,735,445.
This application Mar. 31, 1988, Ser. No. 176,343
Claims priority, application Fed. Rep. of Germany, Aug. 31, 1985, 3531191; Feb. 13, 1986, 3604467
Int. Cl.[4] F16L *19/08, 21/06*
U.S. Cl. 285—341 10 Claims



1. A flange connection for two components having a connection joint such as containers, pipes and the like, comprising:

(a) flange means comprising a pair of flanges positioned over said components, for holding said components axially together at the connecting joint, said flange means having a pair of end faces each defining an annular recess which widens conically in the direction of said connecting joint to thereby form, together with the outside circumference of said components, an annular sealing chamber generally triangular in cross-section,

(b) a resilient sealing body positioned within said annular sealing chamber and adapted to surround the connecting joint between said components, said resilient sealing body having a substantially semi-circular radial cross-section in an undeformed condition and comprising an elastomeric ring which has an inwardly open annular groove and an inner ring which sits loosely in said annular groove, and

(c) means for fastening said flanges so that a portion of their end faces are contiguous to each other, said flanges when in such fastened position defining said annular sealing chamber, said resilient sealing body being deformed by said fastening to substantially completely fill said sealing chamber thereby sealing the connecting joint wherein said flange means comprises a pair of flanges each of which is pushed loosely onto the associated component and, in its end face facing away from the sealing chamber, has a clamping chamber, said fastening means comprising at least one annular clamping element positioned in said clamping chamber, said clamping element being supported on the component by means of a radially inwardly located clamping edge which engages said component during fastening, and by a radially outwardly clamping edge which engages a clamping surface of the clamping chamber, said clamping element projecting out of the clamping chamber in the axial direction in such a way that a compressive force applied by the fastening means and acting axially on the clamping element leads to an increase in the outside diameter and a decrease in the inside diameter of the clamping element, said inner ring sitting loosely in a manner to permit working pressure in a medium inside said components to intensify sealing of said elastomeric ring in said sealing chamber.

4,872,713

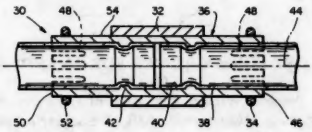
COUPLING DEVICE

Michael Kapgan, Foster City, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 12,260, Feb. 19, 1987, abandoned. This application Jan. 25, 1988, Ser. No. 148,732

Int. Cl.[4] F16L *19/08*

U.S. Cl. 285—381 **10 Claims**



1. A device for coupling to an object, comprising:

(a) a tubular sleeve of which an end portion has a wall that is weakened to facilitate radial deformation thereof, and another portion whose wall is not so weakened;

(b) a shape memory alloy driver having a portion of the sleeve, other than that portion whose wall is weakened, positioned in the direction of its recovery; and

(c) a collar of a dimensionally heat-recoverable polymeric material having at least part of that portion of the sleeve whose wall is weakened positioned in the direction of its recovery.

4,872,714

ELECTRICALLY-POWERED VEHICLE LOCK

Enzo Brusasco, Turin, Italy, assignor to Roltra S.p.A., Turin, Italy

Filed Oct. 13, 1987, Ser. No. 107,968

Claims priority, application Italy, Oct. 17, 1986, 67788 A/86

Int. Cl.[4] E05C *3/26;* **E05B** *47/00*

U.S. Cl. 292—201 **7 Claims**

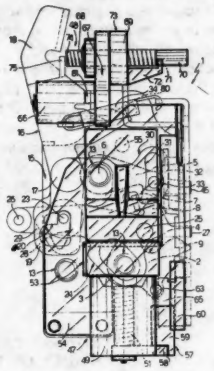
1. An electrically-powered vehicle lock comprising:

a rotary fork having a cavity for engagement with a striker integral attached to a fixed portion of a vehicle, said fork designed to turn between a first partially-closed position and a second fully-closed position;

a retaining element for retaining said fork in one of said first or second positions;

means for releasing said fork and comprising a first electrical actuating means to move said fork from said partially-closed position to said fully-closed position; and second electrical actuating means to move said fork from said fully-closed position to said partially closed position; and;

control means for automatically restoring said first and



second electrical actuating means to respective idle positions, subsequent to each fork rotation operation, wherein said actuating means act in the reverse direction of the initial actuation to reach respective idle positions.

4,872,715

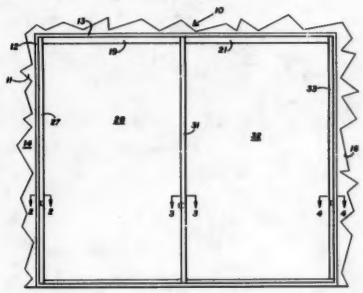
SLIDING DOOR AND LOCK COMBINATION

Frank Correnti, 1740 SW. 10th St., Boca Raton, Fla. 33486

Continuation-in-part of Ser. No. 142,648, Jan. 11, 1988, abandoned. This application Sep. 22, 1988, Ser. No. 247,491

Int. Cl.[4] E05C *1/04*

U.S. Cl. 292—302 **5 Claims**



1. A sliding-door and lock combination comprising:

(A) a building wall defining a rectangular opening, a frame fitting said opening, said frame comprising left and right vertical frame members each comprising vertical strips projecting inwardly therefrom to define a panel receiving recess and said frame also comprising parallel inner and outer track means,

(B) inner and outer sliding-door panels each comprising mid-door and edge-door end posts, said panels being mounted on said tracks to slide one behind the other,

(C) a first pair of angles and locking pin locking the outer of said panels to one of said vertical frame members, one leg of each of said angles terminating in a tubular portion and the other leg comprising walls defining screw attachment holes, one of said angles being attached to an edge-door end post of said outer panel and the other of said angles being attached to one of said vertical frame members between two of said strips, said tubular portions of said

angles aligning to accept said pin, said outer panel being closed,

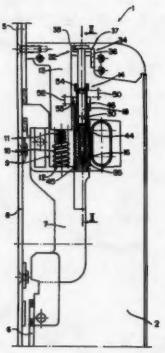
(D) a second pair of angles and locking pin locking the inner of said panels at the other of said vertical frame members, one leg of each of said angles of said second pair of angles terminating in a tubular portion and the other leg defining screw attachment holes, one of said second pair of angles being attached to an edge-door end post of said inner panel and the other of said second pair of angles being attached to said wall at a point inside the innermost of said strips, said tubular portions of the angles of said second pair of angles aligning to accept said second pin, said inner panel being closed.

4,872,716

CASEMENT LOCK, NOTABLY OF THE TYPE COMPRISING A PLURALITY OF OPERATING RODS WITH RESILIENT RETURN MEANS

Legrand Jean-Claude, Reding, and Prevot Géfard, Willerwald, both of France, assignors to Ferco International, Sarrebourg, France

Filed Jun. 3, 1988, Ser. No. 201,875
Claims priority, application France, Jun. 11, 1987, 87.08316
Int. Cl.[4] E05C 9/02
U.S. Cl. 292—336.3 8 Claims



1. A casement lock comprising:

(a) a plurality of operating rods adapted to be positioned in a locking position;

(b) means for actuating at least one of said plurality of operating rods to move with a velocity into a locking position operably associated with said plurality of operating rods;

(c) resilient means for urging at least one of said operating rods to the locking position;

(d) a casing housing said means for actuating;

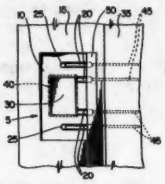
(e) damping means for reducing said velocity of said at least one of said plurality of operating rods during movement to the locking position, said damping means comprises a double-acting shock absorber having a fixed piston slidable in a central bore of a movable piston, the movable piston being slidable in a bore of a cylindrical body, the cylindrical body being rigidly connected to said casing, and said movable piston being coupled to said operating rods.

4,872,717

STRIKE PLATE REINFORCING DEVICE

Richard J. McEvoy, Box 383, Manotick, Canada K0A 2N0, and Robert A. Close, 61 McEwen Ave., #702, Ottawa, Canada K2B 5L3

Filed Mar. 28, 1988, Ser. No. 174,303
Int. Cl.[4] E05B 15/02
U.S. Cl. 292—340 6 Claims



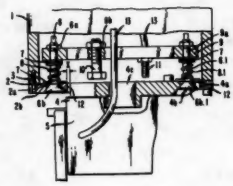
1. A reinforcing device for reinforcing a doorjamb strike plate, said reinforcing device comprising a rigid body whereby said body is configured for cooperating with said strike plate, said body including a plate and means integral to said body for fastening a fastener thereto to secure said reinforcing device to a doorjamb, whereby said plate is configured for installation between said strike plate and said doorjamb and said fastening means is configured for receiving a fastener and for permitting passage of said fastener into said doorjamb in a direction which is at an angle of less than 25 degrees to a plane defined by said strike plate, wherein said fastening means comprises at least one passageway in said plate for receiving and guiding said fastener and said body further comprises a raised border edge along an inner length thereof adjacent said plate, said passageway being formed in and at an intersection of said plate and border edge.

4,872,718

SUPPORT FOR A GRIPPER FOR AN INDUSTRIAL ROBOT

Klaus K. Nerger, Witten, Fed. Rep. of Germany, assignor to Mannesmann Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany

Filed Nov. 19, 1987, Ser. No. 122,914
Claims priority, application Fed. Rep. of Germany, Dec. 1, 1986, 3640973
Int. Cl.[4] B25J 17/02, 19/06
U.S. Cl. 294—86.4 20 Claims



1. A support for a gripper of an industrial robot comprising

a fixed plate;

a connection plate;

a spring-supported plate;

means for maintaining an approximate relative position of the spring-supported plate relative to the fixed plate;

means for supporting and maintaining an approximate relative position of the connection plate relative to the spring-supported plate;

a fixed-plate stop providing a rest position between the fixed plate and spring-supported plate;

fixed-plate springs disposed between the fixed plate and spring-supported plate for maintaining a relative position

between the fixed plate and spring-supported plate with reference to the fixed-plate stop;

a connection-plate stop providing a rest position between the connection plate and spring-supported plate;

connection-plate springs maintaining a relative position between the spring-supported plate and connection plate with reference to the connection-plate stop.

4,872,719

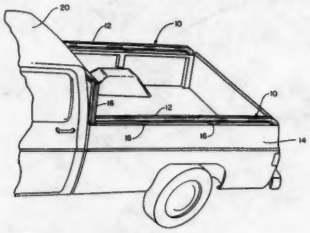
TRUCK RAIL ARRANGEMENT

Billy L. Cardwell, 2209 Post Oak, Belton, Tex. 76513

Filed Jul. 21, 1988, Ser. No. 222,034

Int. Cl.[4] B62D *33/02*

U.S. Cl. 296—34 **1 Claim**



1. A new and improved truck rail assembly comprising:

rail means for attachment to a top surface of a truck bed in a cargo supporting position; and

first connector means for connecting said rail means to said truck bed, said first fconnector means including a first threaded connector threadedly extensible relative to said first connector means and a second threaded connector threadably extensible relative to said first connector means and being oppositely disposed from said first threaded connector, said first threaded connector being engageable with said rail means and said second threaded connector being engageable with said truck bed, and

wherein said first threaded connector is reversibly threaded relative to said second threaded connector, whereby a rotation of a body portion of said first connector means results in said first and second threaded connectors moving concurrently into or out of said body portion depending upon a direction of rotation thereof, and

wherein said first and second threaded connectors are provided with engagement means to prevent relative rotation thereof respectively with said rail means and said truck bed, and

wherein said engagement means includes,

a first pair of pointed members each orthogonally formed on said first connector, and a second pair of pointed members orthogonally formed on said second connector wherein said first and second pair of pointed members engage surface portions of said rail means and said truck bed.

4,872,720

TRUCK BED LINERS

Neil F. Nagy, 1310 Park Western Dr., #159, San Pedro, Calif. 90731

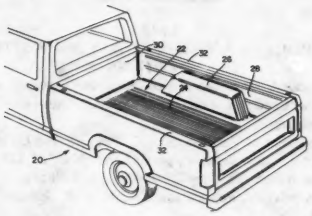
Filed Nov. 17, 1987, Ser. No. 121,518

Int. Cl.[4] B62D *33/00*

U.S. Cl. 296—39.1 **10 Claims**

1. A liner for a truck bed of the type having a substantially horizontal bottom wall interrupted by first and second wheel wells, a substantially upright front wall and first and second side walls, the side walls each having an upper rail-like portion substantially parallel to the other rail-like portion and spaced a first predetermined distance therefrom, the side walls also each having a lower portion spaced from the lower portion of the other side wall by a distance exceeding said first predetermined distance, the liner comprising:

a unitary structure comprising a bottom panel having first and second side edges and front and rear edges, a front panel having an upper edge, a lower edge and first and second side edges, and first and second side panels each having an upper edge, a lower edge and front and rear edges, said bottom panel being formed to lie against the bottom wall of a truck bed and over the wheel wells thereon, said bottom panel being integrally joined at said first and second side edges to said lower edges of said first and second side panels, said bottom panel also being integrally joined at said front edge to said lower edge of said front panel, said first and second side panels being integrally joined to said first and second side edges, respectively, of said front panel, said first and second side panels being spaced from each other by a distance approximately equal to said first predetermined distance such that said side panels are substantially flush with the upper rail-like portions of the truck bed, the region of said first and second side panels adjacent the top edge thereof being formed outward at an elevation slightly below the upper rail-like portions of the truck bed to fit thereunder and including means for maintaining the top edge of said first and second side panels spaced apart by approximately said first predetermined distance;



whereby said liner together with the side rails of the truck bed define an approximately rectangular truck bed, as interrupted by the provision in the bottom panel for the wheel wells of the truck.

4,872,721

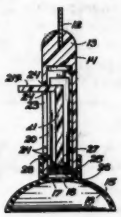
AUTOMOTIVE SUNSCREEN

James R. Sniadach, 1871 Page #3, San Francisco, Calif. 94117

Filed Aug. 10, 1988, Ser. No. 230,601

Int. Cl.[4] B60J *3/00*

U.S. Cl. 296—97.2 **6 Claims**



1. An automotive sunscreen apparatus for attachment to an automotive interior comprising,

a planar sunscreen member for limiting passage therethrough, and

an elongate support defined by a central axis integrally secured to and axially aligned with said sunscreen member, and

said support including a plurality of securement means for securing said support to a plurality of various surfaces, and

wherein said planar screen member is opaque, and

wherein said planar sunscreen member is formed of photochromic material to progressively darken when exposed to progressively brighter light conditions, and

wherein said securement means includes a resilient suction cup integrally secured to a distal end of said elongate support, and

wherein said support means further includes a hollow tubular member reciprocally slidable from interiorly of said support to a position exteriorly thereof with a magnet secured at an end thereof for attachment to a surface.

4,872,722
SUN ROOF FOR VEHICLES HAVING PROTECTIVE SCREENS

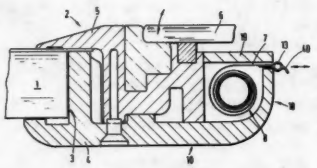
Rolf Farmont, Dusseldorf, Fed. Rep. of Germany, assignor to Farmont Produktion GmbH & Co. KG., Dusseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 13,352, Feb. 11, 1987, abandoned, which is a continuation-in-part of Ser. No. 733,138, May 10, 1985, abandoned. This application Sep. 1, 1988, Ser. No. 239,611

Claims priority, application Fed. Rep. of Germany, May 15, 1984, 3417983

Int. Cl.[4] B60J *7/08*

U.S. Cl. 296—214 **4 Claims**



4. A sun roof for a vehicle having an opening in the roof thereof, said sun roof comprising a single cover for the opening, frame means for supporting said cover for the opening, and sun protective screen means enclosed and supported by said frame means and located beneath said cover, said sun protective screen means comprising two sun protective screens and two independently operated roller devices for rolling and unrolling said two sun protective screens, said frame means comprising upper and lower frame members clamping therebetween an edge portion of the roof defining the opening, one of said upper and lower frame members supporting said roller devices, and one of said upper and lower members having a first portion for engaging an edge portion of the roof and extending from said edge portion inwardly relative to the opening to a location beyond said roller devices and a second portion projecting from said first portion at said location into the roof opening for partially enclosing said roller devices between upper and lower frame members.

4,872,723
SAFETY TRAY

Thomas W. Kopf, Littleton, Colo., assignor to Master Products Inc., Des Moines, Iowa

Filed Mar. 3, 1988, Ser. No. 163,787

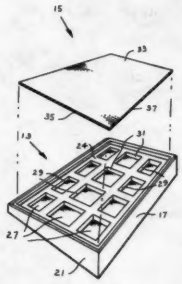
Int. Cl.[4] B60R *21/00*

U.S. Cl. 297—216 **10 Claims**

1. Safety tray comprising:

(a) Support frame having a generally rectangular configuration in plan form, a flat bottom, and a front wall, a rear wall and opposing side walls, a sunken planar shelf in the upper surface of said frame bounded by upwardly extending portions of said front, rear and side walls, said planar shelf having an array of a plurality of regularly shaped cavities therein, said cavities bounded by a grid of longitudinally and transversely extending ribs, said frame composed of a low-density, highly resilient polymeric material in molded configuration;

(b) generally rectangular corrugated top board comprising a flat top sheet and a flat bottom sheet of plastic material with a corrugated plastic layer affixed between said



sheets, said corrugated board covering said sunken planar shelf with its lower surface supported in non binding engagement by said ribs, wherein said upwardly extending wall portions provide lateral and longitudinal support to said board, said corrugated board having ridges and furrows lying in a direction parallel to said front and rear frame walls; and

(c) flexible, resilient plastic outer coating, enveloping the entire outer surface of said combined support frame and corrugated board, and said outer coating holding said board in engagement with said frame.

4,872,724
FIXING DEVICE FOR A COVERING, ESPECIALLY A COVERING OF A SEAT

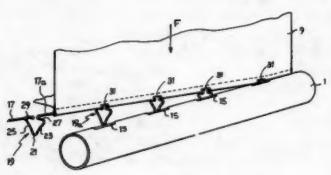
Serge Deley, Seloncourt, and Francois Fourrey, Montbeliard, both of France, assignors to ECIA–Equipements Et Composants Pour L'Industrie Automobile, Audincourt, France

Filed Nov. 10, 1988, Ser. No. 269,331

Claims priority, application France, Nov. 24, 1987, 87 16287

Int. Cl.[4] A47C *27/00*

U.S. Cl. 297—218 **10 Claims**



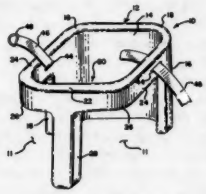
1. Device for fixing a covering, comprising a profiled section (1), having a series of longitudinal slots (15), and an edging wire (13) bent at at least two places to form fasteners (19, 19*a*) intended to cooperate with the slots, characterized in that each fastener (19,19*a*) lies generally in a plane inclined to the axis of the edging wire (13), and is deformable by twisting for the purpose of its insertion into a slot (15) in the profiled section, but resiliently recovers after this insertion its initial shape and a position inclined to the wire and to the slot.

4,872,725

CHILD SEAT

Terri A. Hakeem, 2007 N. Shiawassee, S.E., Grand Rapids, Mich. 49506

Filed Aug. 17, 1987, Ser. No. 85,401
Int. Cl.[4] A47C *1/08*
U.S. Cl. 297—250 7 Claims



1. A vehicle comprising a child's wagon, waid vehicle having a body defining a bed upon which the child sits, and a restraint resting on said bed, said restraint comprising:

a back support comprising a transverse back panel and longitudinal side panels joined by curved intermediate panels, said transverse back, longitudinal side and curved panels defining a wrap-around back support, said curved intermediate panels having a curvature received within the wagon body having complementary curved rear portions, a pair of side portions forming extensions of said back support, and a transverse front portion, and opening means provided in one of said front and pair of side portions and adapted to receive a child's limbs, the back support, side portions and front portion defining open top and bottom portions for the restraint for receiving the child's body and enabling the child to sit directly on the vehicle bed, a portion of at least one of said side and front portions having a verticle dimension less than that of said back support and being spaced above said bed, said one of said side and front portions cooperating with said bed to define said opening means, at least one of said back support and front and pair of side portions having lower surfaces engaging said bed to support said restraint thereon, said back support and front and side portions forming a partial enclosure adapted to restrain the child, and including means securing said restraint in position on said bed, said restraint further comprising at least one front support depending downwardly from one of said side and front portions, said front and back supports having lower surfaces adapted to engage the bed to support said restraint thereon, and said opening means being partially defined by said front support.

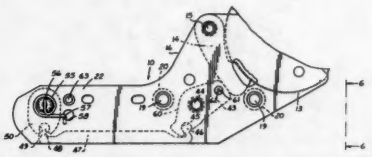
4,872,726

RATCHET SEAT RECLINER WITH REMOTE RELEASE

Harry H White, Battle Creek, Mich., and Karl Ligensa, Obersontheim, Fed. Rep. of Germany, assignors to Keiper Recaro Incorporated, Battle Creek, Mich.

Continuation-in-part of Ser. No. 651,911, Sep. 19, 1984, abandoned. This application Aug. 27, 1987, Ser. No. 91,299
Int. Cl.[4] A47C *1/025*
U.S. Cl. 297—367 16 Claims

1. Ratchet recliner seat hinge assembly having a pair of sandwich seat bracket plates pivotally connected to a toothed sector of a seat back bracket retained in adjusted position by a toothed pawl pivotally mounted between said plates and locked in retaining position by a cam pivotally mounted between said plates, said cam having flat bellcrank extension means, said seat bracket plates having integral remote release lever mounting extension means, intermediate flat release lever means pivotally mounted between the ends of said lever mounting extension means, said pivotal mounting including lever drive connection and external stem, manually actuated lever means having drive connection to said external stem, and linkage connecting means between said bellcrank extension means and intermediate release lever means for transmitting release actuation from said manual lever means to said cam bellcrank extension means, said linkage connecting means being characterized by a flat unitary link formed from substantially flat stock having substantial thickness capable of transmitting push-pull actuating forces extending between said



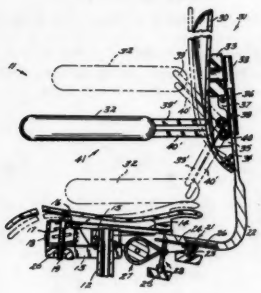
sandwich bracket extension means in a common plane with said cam bellcrank extension means and intermediate release lever means, said flat link having flat arcuate pivot knob extensions engaging circular arcuate, pivot seats in said respective bellcrank extension and said intermediate release lever means, thereby providing a composite flat single layer linkage connecting means between said bellcrank extension means and intermediate release lever means all fitting in co-planar relation between said bracket plates with integral extension means.

4,872,727

ADJUSTABLE ARMED CHAIR

Ralph K. Rye, 1559 College St. SE., Grand Rapids, Mich. 49507

Filed Oct. 5, 1988, Ser. No. 253,601
Int. Cl.[4] A47C *7/54*
U.S. Cl. 297—411 6 Claims



1. In a chair the arm height adjustment combination comprising:

a chair back;

a pair of arms extending from said back of said chair;

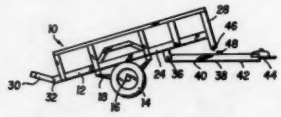
arm rests at the ends of said pair of arms;

operable means including a remotely controlled source of stored energy secured to said back and selectively and eccentrically connected to at least one of said arms and unlocking said arms of said extending arm rests for pantographic height adjustment thereof.

4,872,728
TILT-BED TRAILER

Kevin T. Adams, 13840 Willow Branch Rd., Darlington, Wis. 53530

Filed Apr. 7, 1988, Ser. No. 178,501
Int. Cl.[4] B60D 1/14
U.S. Cl. 298—5 14 Claims



9. In a tilt-bed trailer comprising at least one pair of wheels, a trailer frame mounted on the pair of wheels, the trailer frame comprising a front member in substantial parallel relationship with a rear member, two substantially parallel side members, and a draw bar pivotally connected to the trailer frame, the draw bar having a forward end and at least one rearward end, the improvement comprising:

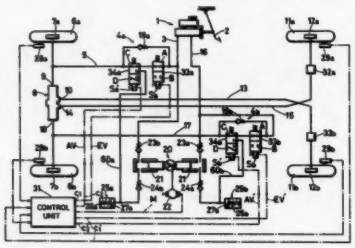
(a) a forward stabilizer cross bar and a rearward stabilizer cross bar, wherein the forward and rearward stabilizer cross bars are distinct from and located in substantially parallel relationship between the front and rear members of the trailer frame, and

(b) a hinge member for pivotally connecting the rearward end of the draw bar to the trailer frame, the hinge member comprising two substantially parallel stabilizer plates mounted orthogonally to the forward and rearward stabilizer cross bars, and a hinge pin, wherein the two stabilizer plates are spaced apart a sufficient distance to receive the rearward end of the draw bar therebetween, wherein each stabilizer plate and the rearward portion of the draw bar have apertures which are in matching alignment to receive the hinge pin therethrough and wherein the forward and rearward stabilizer cross bars are positioned to substantially eliminate any deformation of the stabilizer plates.

4,872,729
ANTI-SKID CONTROL APPARATUS FOR A VEHICLE BRAKING SYSTEM

Tetsuro Arikawa, Kanagawa, Japan, assignor to Nippon ABS, Ltd., Japan

Filed Sep. 17, 1987, Ser. No. 97,879
Claims priority, application Japan, Sep. 19, 1986, 61-221033
Int. Cl.[4] B60J 8/82, 8/64
U.S. Cl. 303—92 14 Claims



1. In an anti-skid control apparatus for a vehicle braking system including:

(A) a pair of front wheels, and a pair of rear wheels in which wheel cylinders are diagonally connected in conduits;

(B) a first fluid pressure control valve device for controlling the brake fluid pressure of the wheel cylinder of one of said front wheels, arranged between a first fluid pressure generating chamber of a tandem master cylinder and said wheel cylinder of the one front wheel;

(C) a second fluid pressure control valve device for controlling the brake fluid pressure of the wheel cylinder of another of said front wheels, arranged between a second fluid pressure generating chamber of said tandem master cylinder and said wheel cylinder of the other front wheel;

(D) a control unit for judging the said conditions of said front and rear wheels and for generating control signals for controling said first and second fluid pressure control valve devices; and

(E) a valve apparatus for generating a fluid pressure in accordance with the lower of the brake fluid pressures of said front wheels controlled with said first and second fluid pressure control valve devices, being arranged between said wheel cylinders of the front wheels and thoe of the rear wheels; the improvements in which, when a brake-relieving output signal for decreasing the brake fluid pressure is obtained from only one of said rear wheels, it is neglected, and when the brake-relieving output signals are obtained from both of said rear wheels, the brake-relieving output signal of the one of said rear wheels which is obtained later than that of the other is logically combined with the brake-relieving output signal of the one of said front wheels running on the same side as said one of the rear wheels, to form a brake-relieving control signal for controlling said first or second fluid pressure control valve device connected to the wheel cylinder of said one front wheel, and a brake-increasing control signal for increasing the brake fluid pressure by said first or second fluid pressure control valve device after said brake-relieving control signal disappears, is formed on the basis of the brake-increasing output signal of the one of said one front and rear wheels on said same side which has a stronger locking tendency than the other.

4,872,730
BRAKING CONTROL APPARATUS FOR USE IN MOTOR VEHICLE

Kozi Takagi, Takahama; Noriyuki Ido, Aichi; Sadayuki Ohno; Hideaki Suzuki, both of Kariya; Yoshiaki Inoue, and Yoshihisa Nomura, both of Toyota, all of Japan, assignors to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan

Filed Oct. 18, 1988, Ser. No. 259,583
Claims priority, application Japan, Oct. 19, 1987, 62-263536
Int. Cl.[4] B60T 8/88
U.S. Cl. 303—92 5 Claims

1. A braking control apparatus for use in a motor vehicle having at least one wheel, comprising:

master cylinder means for generating a hydraulic pressure in response to a braking operation by a driver of said motor vehicle;

accumulator means for accumulating a hydraulic pressure;

wheel braking cylinder means for braking said wheel in accordance with a hydraulic pressure supplied thereinto;

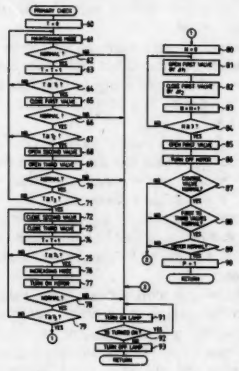
passage means disposed in common between said wheel braking cylinder means and said master cylinder means or said accumulator means so that said wheel braking cylinder means is communicated through said passage means with said master cylinder means or said accumulator means;

cut-off valve means including first means provided between said master cylinder means and said passage means for controlling communication between said master cylinder means and said passage means and further including second means provided between said accumulator means and said passage means for controlling the communication between said accumulator means and said passage means, thereby allowing said first and second means to cut off the communication between said master cylinder means and

said passage means in between said accumulator means and said passage means;

control valve means provided in said passage means for cutting off and establishing the communication between said passage means and said wheel braking cylinder means; and

control means for checking the normality of operation of said cut-off valve means and said control valve means, said control means operating said control valve means so as to cut off the communication between said wheel braking cylinder means and said passage means, operating said cut-off valve means so as to cut off the communication



between said master cylinder and said passage means and to establish the communication between said accumulator means and said passage means, operating said cut-off valve means so as to cut off the communication between said accumulator and said passage means and further between said master cylinder means and said passage means, operating said control valve means so as to establish the communication between said wheel braking cylinder and said passage means so as to reduce the pressure in said passage means after checking the normality of the valve means operation, and operating said cut-off valve means so as to establish the communication between said master cylinder and said passage means.

4,872,731

VEHICULAR BRAKE CONTROL SYSTEM

Masatoshi Nakamura, Atsugi, Japan, assignor to Nissan Motor Company, Japan

Filed Oct. 17, 1986, Ser. No. 920,268

Claims priority, application Japan, Oct. 18, 1985, 60-232380

Int. Cl.[4] B60T *8/86, 13/16, 8/58*

U.S. Cl. 303—93 **11 Claims**

1. A vehicular brake control system comprising:

(a) a brake pedal;

(b) a master cylinder operatively connected to said brake pedal to generate hydraulic pressure in fluid in the system in accordance with a depression force imposed on said brake pedal;

(c) at least one fluid passage connected to said master cylinder;

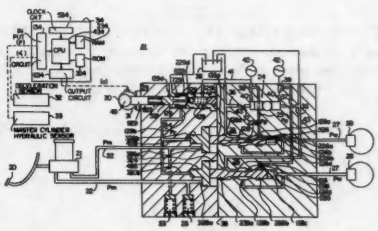
(d) first means incorporated in said fluid passage for maintaining a fixed relationship between a stroke of said brake pedal and the depression force imposed on said brake pedal;

(e) second means for producing an input hydraulic pressure when said brake pedal is depressed;

(f) third means responsive to the hydraulic pressure of said master cylinder in said at least one fluid passage and to a control hydraulic pressure for converting the input hydraulic pressure derived from said second means to an output hydraulic pressure for application to a wheel cylinder incorporated in a brake apparatus on a vehicle tire wheel;

(g) fourth means for generating the control hydraulic pressure in accordance with a control signal;

(h) fifth means for detecting a braking deceleration rate;



(i) sixth means for detecting the depression force applied to said brake pedal; and

(j) seventh means for producing said control signal according to the braking deceleration rate detected by said fifth means so that the braking deceleration rate has a fixed relationship to the depression force applied to said brake pedal.

4,872,732

HYDRAULIC VEHICLE BRAKE SYSTEM

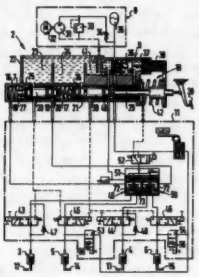
Alwin Steigmaier, Schwieberdingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Oct. 7, 1988, Ser. No. 254,765

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1987, 3743346

Int. Cl.[4] B60T *8/62*

U.S. Cl. 303—110 **4 Claims**



1. A hydraulic brake system for vehicles having wheels with wheel brakes, comprising a master brake cylinder, a brake booster which boosts fluid pressure in said master brake cylinder, an auxiliary pressure source combined with said brake booster for actuating said brake booster for application of brake pressure to the brakes via said master brake cylinder and fluid flow blockable valve assemblies disposed in a brake fluid pressure line between said master brake cylinder and said wheel brakes, and for controlling wheel drive slip via control valves connected to a fluid pressure line between at least one of said blockable valve assemblies and said brakes for a driven wheel, signal control means for controlling said blockable valve assemblies for preventing skidding of a wheel and for

controlling said blockable valves and said control valves for limiting drive slip at driven wheels, said control valves being operative for limiting drive slip by means of pressure from said auxiliary pressure source, said control valves permit brake pressures to be introduced into wheel brakes (5, 6) of the driven wheels for limiting drive slip, with the aid of pressure from said auxiliary pressure source (8, 81).

4,872,733

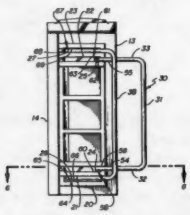
MULTI-POSITION BASE FOR SUPPORTING A CABINET

Thomas A. Tedham, Salem, and See C. Leung, Tewksbury, both of Mass., assignors to Wang Laboratories, Inc., Lowell, Mass.

Filed Dec. 29, 1988, Ser. No. 291,802

Int. Cl.[4] A47B *91/00*

U.S. Cl. 312—255 **5 Claims**



1. A cabinet base for supporting a cabinet with a horizontal bottom surface, said horizontal bottom surface being bounded in part by a first edge and a second edge parallel thereto, said first and second edges having at least twice the length of that distance which separates them, said cabinet base comprising

four cabinet support areas affixed to said cabinet and positioned below said cabinet bottom surface in a plane with each of said cabinet support areas near an end of said edges,

a first pair of pivot pins affixed to said cabinet with a common first axis parallel to said first and second edges and spaced below said bottom, said first axis being substantially closer to said first edge than to said second edge,

a second pair of pivot pins affixed to said cabinet with a common second axis parallel to said second and first edges and spaced below said bottom, said second axis bein substantially closer to said second edge than to said first edge,

pivot pins of said first pair of pivot pins being positioned such that they project onto said second axis between the pivot pins of the second pair of pivot pins,

a first stabilizing leg formed into a U-shape, with a center section and two end sections, distal ends of said two end sections being pierced with pivot holes which engage the pivot pins of said first pair of pivot pins, permitting pivoting of said said first stabilizing leg about said first axis,

a second stabilizing leg formed into a U-shape, with a center section and two end sections, distal ends of said two end sections being pierced with pivot holes which engage the pivot pins of said second pair of pivot pins, permitting pivoting of said said second stabilizing leg about said second axis, the center section of said second leg being longer than the center section of said first leg,

two first outboard support bearings affixed to and spaced from said cabinet horizontal bottom surface, said first outboard support bearings being positioned respectively between the pivot pins of said first pair of pivot pins and said first edge,

two first inboard support bearings affixed to and spaced from said cabinet horizontal bottom surface, said first inboard support bearings being positioned respectively between the pivot pins of said first pair of pivot pins and said second edge,

the end sections of said first stabilizing leg being so shaped and dimensioned, and said first outboard support bearings being so spaced above said plane that said first stabilizing leg is pivotable between

an outboard position in which it bears upon said first outboard support bearings and its center section lies above and touching said plane and extended outboard from said first edge and

an inboard position in which it bears upon said first inboard support bearings and its center section lies above and touching said plane and adjacent to said second edge,

two second outboard support bearings affixed to and spaced from said cabinet horizontal bottom surface, said second outboard support bearings being positioned respectively between the pivot pins of said second pair of pivot pins and said second edge,

two second inboard support bearings affixed to and spaced from said cabinet horizontal bottom surface, said second inboard support bearings being positioned respectively between the pivot pins of said second pair of pivot pins and said first edge,

the end sections of said second stablizing leg being so shaped and dimensioned, and said second outboard support bearings being so spaced above said plane that said second stabilizing leg is pivotable between

an outboard position in which it bears upon said second outboard support bearings and its center section lies above and touching said plane and extended outboard from said second edge and

an inboard position in which it bears upon said second inboard support bearings and its center section lies above and touching said plane and adjacent to said first edge,

the two end sections of said first stabilizing leg having offset bends positioning the end sections of the first stabilizing leg above the center section of the second stabilizing leg when said first stabilizing leg is in its outboard position and the second stabilizing leg is in its inboard position,

whereby

with said first stabilizing leg in its said outboard position and said second stabilizing leg is in its said outboard position, said cabinet base provides stable support for said cabinet with said bottom surface horizontal, when said cabinet is removed from any wall,

with said first stabilizing leg in its said inboard position and said second stabilizing leg is in its said inboard position, said cabinet base provides stable support for said cabinet with said bottom surface horizontal, when said cabinet is positioned with its first edge against a wall,

with said second stabilizing leg in its said inboard position and said first stabilizing leg in its said outboard position, said cabinet base provides stable support for said cabinet with said bottom surface horizontal, when said cabinet is positioned with its second edge against a wall, and

with said first stabilizing leg in its said inboard position and with said second stabilizing leg in its said inboard position said cabinet base provides a compact envelope for shipping.

4,872,734

DRAWER SLIDES WITH SELF-ACTUATING LATCHING SYSTEMS

Robert Rechberg, 3800 E. Miraloma Ave., Anaheim, Calif. 92806

Continuation-in-part of Ser. No. 64,407, Jun. 22, 1987, Pat. No. 4,749,242. This application Jun. 6, 1988, Ser. No. 203,233

Int. Cl.[4] A47B *88/10*; F16C *21/00*

U.S. Cl. 312—333 **29 Claims**

1. A drawer slide assembly comprising:

at least first, second, and third slide members having proximal and distal longitudinal ends, said second and third slide members having internally formed elongated channels extending between said proximal and distal ends;

said second slide member being longitudinally slidably disposed within the elongated channel of the third slide

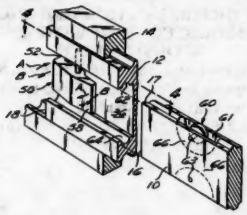
member so as to be movable between an "unextended" position wherein the second slide member is fully disposed within the elongate channel of the third slide member and an "extended" position wherein a portion of the second slide member extends beyond the distal end of the third slide member;

said first slide member being longitudinally slidably disposed within the elongated channel of the second slide member so as to be movable between an "unextended" position wherein said first slide member is fully disposed within the elongated channel of the second slide member and an "extended" position wherein a portion of the first slide member extends beyond the distal end of the second slide member;

a first latching mechanism operative to releasably lock said second slide member in fixed longitudinal position relative to said third slide member, said first latching mechanism comprising:

a first latching member positioned on said second slide member;

a first aperture extending through said third slide member and alignable with at least a portion of said first latching member upon slidable movement of said second slide member relative to said first slide member;



said first latching member being spring biased to cause a portion of said first latching member to extend into said first aperture upon said slidable alignment thereof and to thereby hold said second slide member in fixed longitudinal position relative to said third slide member; and

a second latching mechanism operative to releasably lock said first slide member in fixed longitudinal position relative to said second slide member, said second latching mechanism comprising:

a second latching member positioned on said first slide member;

a second aperture extending through said second slide member and alignable with at least a portion of said second latching member upon slidable movement of said first slide member within the elongated channel of said second slide member;

said second latching member being biased to urge at least said portion of said first latching member into said second aperture when said aperture becomes slidably aligned therewith and to thereby hold said first slide member in fixed longitudinal position relative to said second slide member.

4,872,735

DRAWER INCLUDING ROLLER CARRIER CONNECTING SIDE WALLS TO REAR MEMBER

Erich Röck, and Josef Brunner, both of Höchst, Austria, assignors to Julius Blum Gesellschaft M.B.H., Höchst, Austria

Filed Jul. 1, 1987, Ser. No. 68,335

Claims priority, application Austria, Jul. 14, 1986, 1898/86

Int. Cl.[4] A47B *88/00*

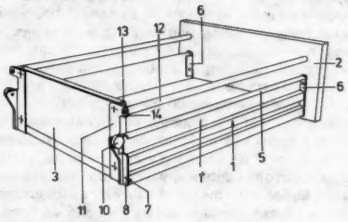
U.S. Cl. 312—342 **12 Claims**

1. In a drawer including two side walls, a front member, a rear member, and a bottom member, the improvement comprising:

each said side wall including a longitudinally extending projection directed inwardly of the drawer;

a separate roller carrier connected to the rear end of each said side wall, each said roller carrier having mounted thereon a respective roller; and

each said roller carrier including a forwardly extending flange positioned between the respective side edge of said



rear member and the respective said side wall, said flange having a dimension in a direction parallel to the longitudinal dimension of said side wall at least equal to the thickness of said rear member, said flange having a height extending to the top of said side wall, and said flange having a laterally outward configuration adapted to the contour of said side wall.

4,872,736

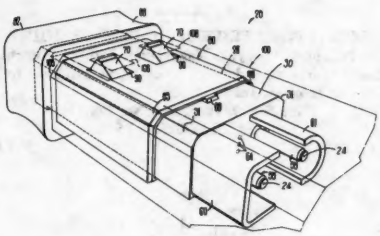
CONNECTOR ASSEMBLY HAVING A LATCHING MECHANISM

Clyde J. Myers, Stone Mountain; Daniel L. Stephenson, Norcross, and Ruben Travieso, Duluth, all of Ga., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 19, 1988, Ser. No. 183,194

Int. Cl.[4] G02B *6/36*

U.S. Cl. 350—96.20 **17 Claims**



1. A connector assembly, which includes:

a connector body which includes a first end and a second end and at least one connective device disposed adjacent to said first end and adapted to terminate a communications path, said connector body including latching means;

a cover which is disposed about said connector body and which is adapted to be moved slidably along said connector body; and

a coupling for receiving at least a portion of said connector body and of said cover and for aligning said connective device of said connector body with another communication path, said latching means being effective when said cover is in a first position to secure said connector body to said coupling and cooperating with said cover as said cover is moved to a second position to cause said latching means to become disengaged from said coupling and allow withdrawal of said connector body from said cou-

pling said latching means also cooperating with said cover to become disengaged from said coupling when said connector body is subjected to a force having a predetermined magnitude and being in a direction from said first end to said second end.

6. An optical fiber connector assembly, which comprises:

a connector body which includes a connection end and a cable input end and two connective devices which are disposed adjacent to said connection end and each of which is adapted to terminate an optical fiber, said connector body including two latching nubs projecting and being biased normally outwardly therefrom, each said latching nub including a latching surface and a camming surface and being attached to a cantilevered arm which is formed integrally with said connector body,

a release cover which is disposed slidably about said connector body and which includes at least two windows in one portion thereof for allowing a portion of each said latching nub to project outwardly therefrom, said release cover being adapted to be moved slidably by a user grasping said cover adjacent to said cable input end and moving it toward said cable input end thereby causing a wall which defines each said window to cam along one of the camming surfaces to urge said latching nubs inwardly and withdraw said nubs into said windows, said latching nubs normally extending beyond said windows; and

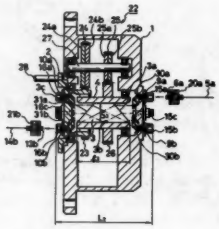
a coupling for causing said connective devices of said connector body to become connected to other optical fibers, said coupling including a housing adapted to receive at least a portion of said connector body and of said cover and including at least two openings therein so that when said connector body is received in said housing, said latching nubs which extend beyond said windows project into said openings with said latching surfaces thereof being engaged by walls which define said openings to secure said release cover to said coupling, and such that when a force of at least a predetermined magnitude is applied to said release cover in a direction toward its cable end, said release cover is moved slidably to depress said latching nubs and to withdraw them from said openings in said housing to permit withdrawal of said connector body from said coupling.

4,872,737

MULTI-PORT FIBEROPTIC ROTARY JOINT

Toshio Fukahori; Hideyuki Takashima, both of Hitachi, and Hitoshi Morinaga, Takahagi, all of Japan, assignors to Hitachi Cable Limited, Tokyo, Japan

Filed Sep. 7, 1988, Ser. No. 241,536
Int. Cl.[4] G02B 6/36
U.S. Cl. 350—96.2 **50 Claims**



1. A multi-port fiberoptic rotary joint of the type having a fixed member and a rotative member, comprising:

a trapezoid prism having an aperture, an entrance side, an exit side and an optical axis, said prism being disposed between the rotative member and the fixed member of the rotary joint so as to be rotatable relative to said rotative member and coaxial with said rotative member;

a speed change gear mechanism for transmitting the rotation of said rotative member to the trapezoid prism to rotate the trapezoid prism at an angular velocity half the angular velocity of said rotative member;

reflector means provided on the entrance side of the trapezoid prism so as to optically guide the light coming from a region outside the aperture of said trapezoid prism to the trapezoid prism such that the light is parallel to the axis of the trapezoid prism within the aperture thereof, and reflector means provided on the exit side of the trapezoid prism so as to optically guide the light emanating from the trapezoid prism to a region outside the aperture of said trapezoid prism;

a plurality of pairs of convergent lenses respectively provided on the rotative member and the fixed member, the convergent lenses of each pair optically facing the entrance and exit surfaces of the trapezoid prism via the reflector means and optically facing each other, the convergent lenses in each pair thereof being spaced apart a distance greater than the width of the aperture of said trapezoid prism; and

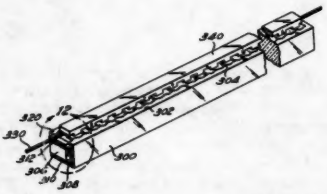
entrance and exit side optical fibers respectively connected to the entrance and exit surface side convergent lenses.

4,872,738

ACOUSTO-OPTIC FIBER-OPTIC FREQUENCY SHIFTER USING PERIODIC CONTACT WITH A SURFACE ACOUSTIC WAVE

William P. Risk, Palo Alto, and Gordon S. Kino, Stanford, both of Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Filed Feb. 18, 1986, Ser. No. 830,461
Int. Cl.[4] G02F 2/02
U.S. Cl. 350—96.29 **32 Claims**



1. An apparatus for shifting the optical frequency of an optical signal from a first optical frequency to a second optical frequency, comprising:

an optical fiber having first and second propagation paths for propagation of said optical signal therein, said first propagation path having a first optical propagation constant k_1 at said first optical frequency, said second propagation path having a second optical propagation constant k_2 at said second optical frequency;

means for generating an acoustic wave having an acoustic frequency equal to the difference between said first optical frequency and said second optical frequency;

acoustic propagation means for propagating said acoustic wave in proximity to said optical fiber, said acoustic propagation means having an acoustic propagation constant k_a; and

means for positioning said optical fiber in acoustic contact with said acoustic propagation means at periodic locations along said fiber so that said acoustic wave stresses said optical fiber at said periodic locations to cause optical energy to be coupled from said first optical propagation path to said second optical propagation path and to be shifted in frequency by an amount equal to the acoustic frequency, said periodic locations spaced apart from each other by a distance Λ_g and having an effective propagation constant k_g equal to $2\pi/\Lambda_g$, said effective propagation constant k_g having a value such that the difference be-

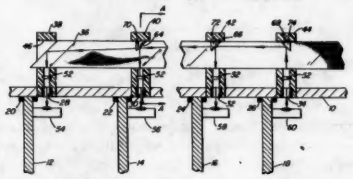
tween said acoustic propagation constant k_a and said effective propagation constant k_e is substantially equal to the difference between said first optical propagation constant k_1 an said second optical propagation constant k_2.

4,872,739

OPTICAL BUSBAR

Kahn: David A., Nepean; Grant K. Pacey, Stittsville; Jaroslav M. Hvezda, Nepean, and Jack F. Dalgleish, Ottawa, all of Canada, assignors to Northern Telecom Ltd., Montreal, Canada

Continuation of Ser. No. 840,262, Mar. 17, 1986, abandoned. This application May 5, 1988, Ser. No. 193,162
Int. Cl.[4] G02B 6/28
U.S. Cl. 350—96.16 21 Claims



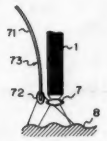
1. Apparatus comprising a backplane, a plurality of circuit cards each associated with an optical element, and an optical busbar, said circuit cards being mounted upon said backplane substantially parallel with each other and substantially perpendicular to the backplane, said backplane having seating means for said optical busbar, said optical busbar comprising a rod of optically transmissive material having a planar surface along one side thereof, said optical busbar being mounted to said backplane with said planar surface positively located by said seating means, said rod of optically transmissive material having a row of diverter means along its length, the diverter means being spaced apart so as to correspond to the aforesaid optical element associated with said circuit cards, said diverter means being so disposed relative to said planar surface as to divert light travelling along said rod to emerge laterally through said planar surface at intervals corresponding to the spacing of said diverter means and impinge upon said optical element.

4,872,740

ENDOSCOPE

Hiromu Terada, Otake; Naoyuki Fukahori, Ayase, and Kenichi Sakunaga, Otake, all of Japan, assignors to Mitsubishi Rayon Company, Ltd., Tokyo, Japan

Filed Feb. 5, 1988, Ser. No. 152,492
Claims priority, application Japan, Feb. 12, 1987, 62-28092; Jun. 24, 1987, 62-155297
Int. Cl.[4] G02B 6/06
U.S. Cl. 350—96.26 7 Claims



1. An endoscope comprising:
an image-transmitting member made of a multifilament type plastic optical fiber having a substantial rectangular cross-section,
an object lens arranged on one end of the optical fiber and means for guiding an image of an object transmitted to the other end of the multifilament type optical fiber to an image-receiving portion, wherein said multifilament type plastic optical fiber has an islands-in-sea structure in which 50 to 10,000 light-transmitting core-sheath structure islands having a substantially circular cross-section with a diameter of 5 to 200μ, arranged in the sea such that the same positional relationship of the islands is maintained on both ends of the multifilament type optical fiber, and the core occupancy ratio in the total cross-section of the multifilament type optical fiber is at least 50%.

4,872,741

ELECTRODELESS PANEL DISCHARGE LAMP LIQUID CRYSTAL DISPLAY

James T. Dakin, and Sayed A. El-Hamamsy, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jul. 22, 1988, Ser. No. 222,980
Int. Cl.[4] G02F 1/13
U.S. Cl. 350—345 20 Claims

1. An illuminatable liquid crystal display including:
(a.) a light transmissive liquid crystal display panel; and
(b.) a flat source of uniformly distributed light positioned to illuminate said panel by directing visible light from a front surface of said source through said panel, said source comprising:
(1.) a flat, electrodeless lamp containing a fill gas therein capable of emitting radiation of a predetermined wavelength when undergoing excitation, said lamp including a first phosphor-coated transparent light-emitting surface and a second phosphor-coated light-emitting surface in parallel therewith; and
(2.) coil means for coupling an electromagnetic field into the interior of said lamp to establish a plasma arc discharge therein, whereby ultraviolet radiation from said arc discharge excites the first and second phosphor-coated light-emitting surfaces to produce said visible light.

4,872,742

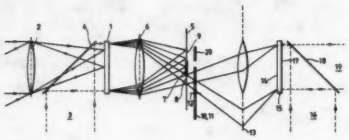
IMAGING SYSTEMS FOR MAINTAINING CONSTANT THE INTENSITY OF AN OUTPUT IMAGE

Henry J. White, and Christopher Stace, both of Bristol, England, assignors to British Aerospace Public Limited Company, London, England

Filed Jul. 24, 1987, Ser. No. 77,245
Claims priority, application United Kingdom, Jul. 25, 1986, 8618219
Int. Cl.[4] G02F 1/13
U.S. Cl. 350—348 6 Claims

1. An imaging system for maintaining constant the intensity of an output image corresponding to a viewed scene, the system comprising:
variable grating modulation means;
focusing means, disposed with an optical path to said variable grating modulation means, for forming an input image of the viewed scene on the variable grating modulation means;
imaging means, coupled to said focusing means, for reading

the input image from said focusing means and for forming a scene intensity distribution pattern corresponding to the input image, wherein the scene intensity distribution pattern comprises two histograms each corresponding to the input image of the viewed scene; and



output means, coupled to said imaging means, for processing the scene intensity distribution pattern from said imaging means to produce an output image of the viewed scene, the output image having a constant range of intensity levels which is not dependent on any change in intensity of the viewed scene.

4,872,743

VARIFOCAL OPTICAL ELEMENT

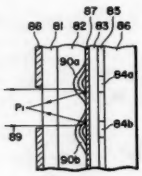
Takeshi Baba; Kazuhiko Matsuoka; Masayuki Usui; Kazuo Minoura, all of Yokohama; Atsushi Someya, Machida, and Masayuki Suzuki, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 943,837, Dec. 18, 1986, abandoned, which is a continuation of Ser. No. 600,959, Apr. 16, 1984, abandoned. This application Jan. 11, 1988, Ser. No. 144,643

Claims priority, application Japan, Apr. 18, 1983, 58-67026; Apr. 19, 1983, 58-67713; Oct. 7, 1983, 58-187859; Oct. 7, 1983, 58-187860; Mar. 26, 1984, 59-58011

Int. Cl.[4] G02F *1/29*; G02B *3/14*

U.S. Cl. 350—353 **9 Claims**



1. An optical element having a variable focal length, comprising:

a medium the refractive index of which varies with temperature, said medium passing an incident light beam therethrough;

a plurality of independently controllable heating means for imparting heat to said medium to create a single continuous index gradient due to a temperature distribution resulting in said medium as a consequence of heat being imparted thereto, wherein said plurality of independently controllable heating means comprise an annular heater and a central heater provided at the center of said annular heater, wherein the heating of said annular heater and said central heater is capable of being selectively controlled by control means to thereby produce concave and convex lens functions of the index gradient formed in said medium, and wherein said plurality of independently controllable heating means is disposed in a plane crossing the light beam; and

control means for independently controlling the amount of heat being imparted to said medium by each of said plurality of heating means to vary the shape of the index gradient formed in said medium.

4,872,744

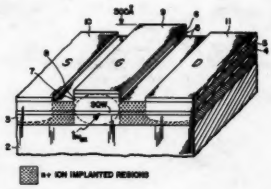
SINGLE QUANTUM WELL OPTICAL MODULATOR

Joseph H. Abeles, Highland Park; Alexander Kastalsky, Wayside, and Robert F. Leheny, Little Silver, all of N.J., assignors to Bell Communications Research, Inc., Livingston, N.J.

Filed Jan. 15, 1988, Ser. No. 144,817

Int. Cl.[4] G02F *1/015*

U.S. Cl. 350—356 **19 Claims**



1. An optical modulator comprising a single quantum well (SQW) and a planar waveguide configuration coextensive with and overlapping said SQW for laterally confining light propagation through the modulator, said waveguide supporting light of a wavelength near or within the absorption wavelength band of excitons formed in said quantum well and monolithic field effect transistor means for altering the density of free carriers in said SQW.

4,872,745

COVER FOR CAR LAMPS

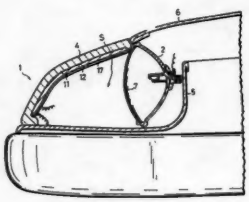
Norio Fujisawa; Toshishige Sakamoto; Toshiyasu Ito, and Junichi Shimada, all of Aichi, Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed Feb. 17, 1988, Ser. No. 156,839

Claims priority, application Japan, Feb. 18, 1987, 62-022989

Int. Cl.[4] G02F *1/17, 1/13*

U.S. Cl. 350—357 **6 Claims**



1. A cover for car lamps comprising:

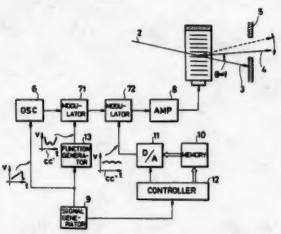
a transparent base, and

a transparent element with variable coloring intensity, the color being controlled by electric conduction, disposed on at least a part of said base, said transparent element being substantially nontransparent and colored when said lamps are turned off and substantially transparent and colorless or disclosed when said lamps are turned on.

4,872,746
LIGHT BEAM DEFLECTOR

Koji Kobayashi, Hino, Japan, assignor to Kowa Company Ltd., Japan

Filed Jan. 19, 1988, Ser. No. 145,032
Claims priority, application Japan, Jan. 16, 1987, 62-6027
Int. Cl.⁴ G02F *1/11*
U.S. Cl. 350—358 **12 Claims**



1. A light beam reflector adapted to deflect a light beam from a light source, comprising:

an acousto-optical element for deflecting said light beam at an angle of deflection which is dependent on the frequency of a drive signal applied thereto, said acousto-optical element having a deflection efficiency which is also dependent on the frequency of said drive signal;

means for generating said drive signal;

a first modulator for modulating the amplitude of said drive signal with first frequency dependent predetermined modulating data to produce a modulated drive signal;

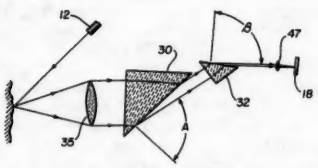
a second modulator for modulating the amplitude of said modulated drive signal with second frequency dependent predetermined modulating data; and

a memory for storing said second modulating data, the modulation of the amplitude of said drive signal being such that said deflection efficiency of said acousto-optical element is substantially independent of the frequency of said drive signal.

4,872,747
USE OF PRISMS TO OBTAIN ANAMORPHIC MAGNIFICATION

Jeffrey A. Jalkio, St. Paul, and Steven K. Case, St. Louis Park, both of Minn., assignors to CyberOptics Corporation, Minneapolis, Minn.

Filed Apr. 15, 1987, Ser. No. 38,846
Int. Cl.⁴ G02B *13/10, 17/00*
U.S. Cl. 350—421 **14 Claims**



1. An anamorphic optical system for detecting light from a light source directed along a light source axis onto an object surface, comprising:

a collimating lens for detecting reflected light from said light source reflected off the object surface and forming said reflected light into a collimated beam, said collimating lens being spaced apart from the object surface to present a stand off distance and having a lens axis offset from said light source axis;

a prism having a first prism surface oriented generally perpendicular to said lens axis for receiving said collimated light beam, whereby the light beam is anamorphically refracted as it passes through said prism so that variations in said stand off distance present large angular shifts of the refracted light beam;

a second prism oriented to receive the refracted light from the first prism and to further anamorphically refract the light beam, said refracted light beam experiencing total internal reflection in said second prism;

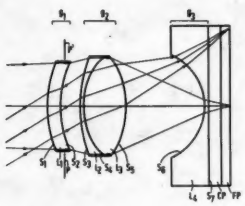
a focusing lens for receiving the refracted light beam; and

a detector positioned to receive the focused light beam from the focusing lens.

4,872,748
PROJECTION-LENS SYSTEM

Josephus J. M. Braat, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 13, 1985, Ser. No. 733,567
Claims priority, application Netherlands, Feb. 18, 1985, 8500454
Int. Cl.⁴ G02B *13/18*
U.S. Cl. 350—432 **4 Claims**



1. A projection-lens system for projecting a magnified image of a scene reproduced by means of a reproduction element onto a projection screen, which lens system comprises, in this order and viewed from the image side, a first group having one aspheric surface, a positive second or main group having two spherical convex outer surface, and a third group comprising a planoconcave lens element whose concave surface which faces the image side is aspheric, the elements of the first group and of the third group being made of transparent plastic, characterized in that the main group provides substantially the entire power of the lens system and comprises a cemented doublet of a convex-concave elment and a biconvex lens element, which elements have substantially equal refractive indices and different dispersions.

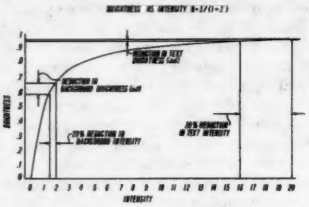
4,872,749
LENS FOR VIDEO TERMINAL SCREEN

David J. Lummis, Hertfordshire, England, and Jon D. Masso, Whitinsville, Mass., assignors to American Optical Corporation, Southbridge, Mass.

Filed Sep. 14, 1984, Ser. No. 650,922
Int. Cl.⁴ G02C *7/10*
U.S. Cl. 351—44 **11 Claims**

1. A method for improving the visual comfort and perceived vision of a person viewing a monochromatic phosphor image on a video display terminal screen, the monochormatic phosphor image being formed by radiation at a primary phosphor emission which comprises causing said person to view said image through a spectacle lens which has been tinted a color

which is approximately the complement to the color of said monochromatic phosphor image wherein said spectacle lens



blocks said radiation at the primary phosphor emission and transmits light at other wavelengths.

4,872,750

IMAGE PROJECTION APPARATUS

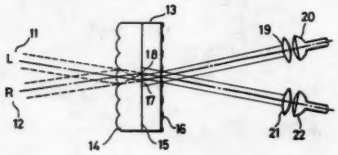
Masanobu Morishita, Osaka, Japan, assignor to NEC Home Electronics Ltd., Osaka, Japan

Continuation of Ser. No. 517,279, Jan. 16, 1984, abandoned. This application Aug. 19, 1987, Ser. No. 88,481

Claims priority, application Japan, Jul. 14, 1982, 57-122717; Jul. 31, 1983, 58-139589; Jul. 31, 1983, 58-139591

Int. Cl.[4] H04N *13/04*

U.S. Cl. 353—7 8 Claims



1. A projected image displaying apparatus including image source means and image displaying means spaced from said image source means, said image source means optically projecting two-dimensional images onto said image displaying means, said image displaying means comprising a transmissive diffusion element onto which said images produced by said image source means are projected, a striped shield plate with alternating light blocking stripes and light transmitting stripes disposed on a surface of said transmissive diffusion element adjacent to said image source means for projecting said images onto said transmissive diffusion element in the form of partially overlapping, interleaved stripes, and a lenticular lens plate disposed on a surface of said transmissive diffusion element opposite from said image source means for displaying the images from the diffusion element as a three-dimensional image.

4,872,751

NON-CONTACT LATERAL DISPLACEMENT SENSOR AND EXTENSOMETER SYSTEM

Michael Hercher, 216 Pleasant St., Marblehead, Mass. 01945

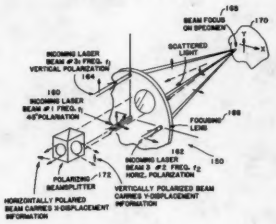
Continuation-in-part of Ser. No. 870,107, Jun. 3, 1986, abandoned. This application Jan. 14, 1988, Ser. No. 144,495

Int. Cl.[4] G01B *9/02*

U.S. Cl. 356—35.5 2 Claims

1. A bilateral displacement sensor system comprising:

means for superimposing a first laser beam at a first frequency and having vertical and horizontal polarization components, a second laser beam at a second frequency and having horizontal polarization components and a third laser beam at the second frequency and having vertical polarization components at a point on a surface of a bilaterally movable body so that each of the first laser beam and the second laser beam and the first laser beam and the third laser beam are incident at a point on the surface of the bilaterally moveable body;



means for detecting the modulation frequency of light scattered by the surface; and

means for processing said detected modulation frequency to determine the horizontal and vertical lateral displacement of the bilaterally moveable body.

4,872,752

DIAGNOSIS OF FREE FATTY ACID TOXICITY BY MONITORING RED BLOOD CELLS MORPHOLOGIC CHANGES

Israel Siegel, 5313 Collins Ave. Apr. 412, Miami Beach, Fla. 33140

Continuation-in-part of Ser. No. 713,861, Mar. 20, 1985, abandoned. This application Sep. 23, 1987, Ser. No. 100,287

Int. Cl.[4] G01N *33/48*

U.S. Cl. 356—39 6 Claims

1. A monitoring method for detecting free fatty acid toxicity, in a patient receiving parentaral fat emulsions,

said method consisting of microscopically observing a drop of fresh blood of the patient,

and comparing the morphology of the red cells in said blood, in their natural wet condition, to the morphology of red cells in serum containing known free fatty acid concentration.

4,872,753

PROCESS CELL WITH TEMPERATURE COMPENSATION

Harald Danigel, and Hans-Rudolf Schatzmann, both of Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jul. 13, 1988, Ser. No. 218,193

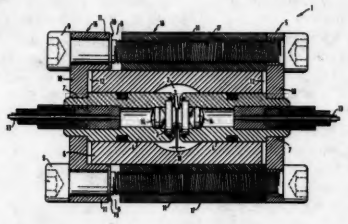
Claims priority, application Switzerland, Jul. 22, 1987, 2774/87

Int. Cl.[4] G01N *21/05*

U.S. Cl. 356—246 12 Claims

1. Process cell (1) with a measuring chamber (2) through which flows particularly a cloudy or dyed or similar liquid with high light absorption upon its processing or further conveyance, which chamber has two windows (3) which upon the measurement lie opposite each other at a short distance, light being introduced into the measuring (2) chamber at one window and being received at the opposite window for further conveyance to a preferably spectroscopic investigation in a photometer or the like, characterised in that the two windows (3) are held in holding devices (4), which are supported by a common frame (5) or the like, which frame (5) is movable relative to the cell housing (6), and that the materials of the holding devices (4) and the frame (5) are matched with regard

to their coefficients of thermal expansion so that the change in length of the frame (5) which is determined by changes in



temperature compensates for the change in length of the holding devices (4) which is determined by changes in temperature.

4,872,754

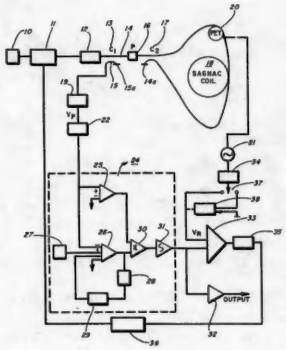
CONSTANT FREQUENCY DIGITAL CLOSED-LOOP OPTICAL FIBER GYRO

Donald L. Ensley, 303 Tom Jones Ct., Bodega Bay, Calif. 94923

Filed Oct. 7, 1987, Ser. No. 105,880

Int. Cl.[4] G01C *19/64*

U.S. Cl. 356—350 **16 Claims**



1. A fiber-optic inertial sensor comprising a sensing coil of optical fiber,

a source of optical energy, operating at a known frequency, for supplying an optical signal to said sensing coil,

means for digitally modulating the intensity of said optical energy source so that said optical signal comprises a series of optical pulses, each at said known source frequency, for which the optical energy is alternately turned on and off for a finite time period at a known sample rate,

a directional coupler connected between said source and both ends of said coil for dividing each pulse of said optical signal between the two ends of said coil so that each pulse of said optical signal is split into two components and propagated in opposite directions through the fiber of the coil,

an optical phase modulator operating at a known modulation frequency and connected to said sensing coil for producing a relative phase difference between the two counter-propagating components of the pulses of said optical signal, and time synchronized with the pulses of said optical signal,

means for digitally sampling the optical phase modulator waveform at a sample rate determined by the optical phase modulator modulation frequency, said relative phase difference remaining independent of said optical modulation frequency, with the magnitude of said relative phase difference varying only in response to a change in movement of said coil,

means for detecting any change said relative phase difference between said counter-propagating components of the pulses of said optical signal to produce an output signal representing said coil movement, and

means responsive to said detected change in said relative phase difference for adjusting the time phase of said series of optical pulses from said source, relative to that of said optical phase modulator, in order to change said relative phase difference between said counter-propagating components, thereby reducing said change in relative phase caused by coil movement without altering said known frequency of said optical energy source.

4,872,755

INTERFEROMETER FOR MEASURING OPTICAL PHASE DIFFERENCES

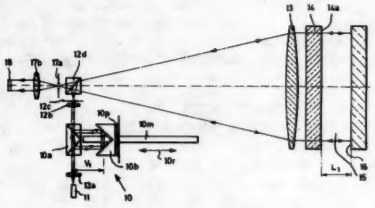
Michael Küchel, Oberkochen, Fed. Rep. of Germany, assignor to Carl-Zeiss-Stiftung, Heidenheim/Brenz, Fed. Rep. of Germany

Filed Mar. 7, 1988, Ser. No. 164,790

Claims priority, application Fed. Rep. of Germany, Mar. 7, 1987, 3707331

Int. Cl.[4] G01B *9/02*

U.S. Cl. 356—360 **16 Claims**



1. An interferometer for measuring optical phase differences which occur between two partial beams reflected from a reference surface and from the surface of the part to be measured, respectively, the interferometer comprising:

light source means for providing a coherent beam directed along a beam path;

optical delay means for splitting said beam into first and second component beams and for generating a first optical path difference between said first and second component beams and for then congruently recombining said component beams;

optical directing means for directing said first and second component beams toward the reference surface and the measurement surface of the part to be measured whereat said partial beams occur and a second optical path difference is generated between said partial beams;

said optical delay means including adjusting means for adjusting said first optical path difference to be approximately equal to said second optical path difference;

said light source means having a coherence length that is less than said second optical path difference;

spatially-resolving receiver means; and,

optical means for transmitting said partial beams reflected from said reference surface and said measurement surface, respectively, so as to image said reference surface and said measurement surface on said receiver means.

4,872,756

DUAL PATH INTERFEROMETER WITH VARYING DIFFERENCE IN PATH LENGTH

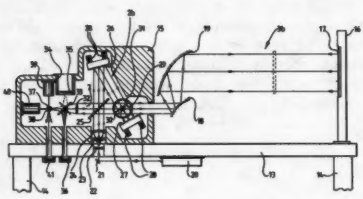
Barry R. Hill, St. Helens, England, assignor to Pilkington Brothers plc, United Kingdom

Filed Oct. 16, 1986, Ser. No. 919,860

Claims priority, application United Kingdom, Oct. 17, 1985, 8525550

Int. Cl.[4] G01B *9/02*

U.S. Cl. 356—361 **12 Claims**



1. An interferometer for producing an interference pattern from substantially monochromatic light travelling along respective first and second optical paths, each path having reflection means for returning light components to a common optical path, means to vary the difference between the first and second optical paths to thereby produce an interference pattern in the common optical path, first detector means for detecting a reference part of the interference pattern produced to derive therefrom a reference signal, second detector means for receiving the interference pattern thereby to derive signals indicative of successive parts of said interference pattern, and means for comparing said reference and successive signals to derive therefrom signals indicative of the optical phase difference corresponding to the interference pattern.

4,872,757

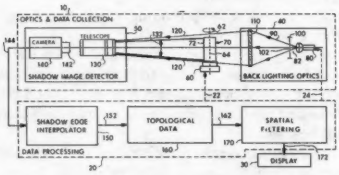
OPTICAL CONVEX SURFACE PROFILING AND GAUGING APPARATUS AND METHOD THEREFOR

Robert H. Cormack, Boulder, and Carey S. Brown, Denver, both of Colo., assignors to Ball Corporation, Muncie, Ind.

Filed Apr. 20, 1988, Ser. No. 183,763

Int. Cl.[4] G01B *11/24*

U.S. Cl. 356—376 **12 Claims**



1. An apparatus for displaying the surface profile of a convex object, said apparatus comprising:

means (40) for uniformly producing converging white light over an area larger than the area of an edge of said convex object being profiled,

means (50) opposite said producing means for detecting the shadow image (800) of said edge of said convex object as illuminated by said producing means, said converging white light being focused in said detecting means, said detecting means generating a plurality of pixel outputs for each of a plurality of vertical locations for said shadow image of said edge,

means (60) for providing movement between said object and said producing and detecting means to provide a plurality of shadow images onto said detecting means corresponding to different edges of said convex object,

means (20) connected to said detecting means and receptive of said plurality of pixel outputs for determining a sub-pixel distance measurement for each of said plurality of vertical locations, said determining means further being capable of arranging said sub-pixel distance measurements into rows of said surface profile corresponding to individual vertical measurements of said shadow image for one of said edges and into columns of said surface profile corresponding to said plurality of edges, and

means (30) connected to said determining means and receptive of said row and column measurements for displaying said surface profile.

4,872,758

FILM THICKNESS-MEASURING APPARATUS

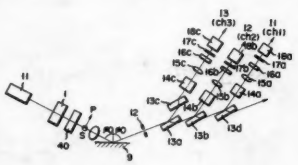
Takao Miyazaki; Yoshiro Yamada, and Isamu Komine, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

Filed Jul. 22, 1988, Ser. No. 223,275

Claims priority, application Japan, Jul. 23, 1987, 62-184250

Int. Cl.[4] G01B *11/06*

U.S. Cl. 356—381 **10 Claims**



1. A film thickness-measuring apparatus comprising:

circularly polarized light forming means for forming circularly polarized light which can be incident on an incidence plane of an object to be measured at a predetermined angle;

beam splitter means for converting the light reflected by the object into a plurality of light beams;

a plurality of analyzers for allowing the plurality of light beams obtained by said beam splitter means to pass at different transmission polarization azimuths, respectively;

electrical signal output means for outputting electrical signals corresponding to light amounts/intensities of the plurality of light beams from said analyzers; and

an arithmetic processing section for receiving the respective electrical signals from said electrical signal output means and performing predetermined arithmetic processing for the electrical signals to obtain an amplitude ratio and a phase of two ellipsometric parameters.

4,872,759

SENSOR FOR GASES OR IONS

Eva-M. Stich-Baumeister, Erlangen; Karl-Otto Dohnke, Forchheim-Kersbach, and Albrecht Winnacker, Erlangen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Jul. 7, 1988, Ser. No. 216,134

Claims priority, application Fed. Rep. of Germany, Jul. 8, 1987, 3722449

Int. Cl.[4] G01N *21/00*

U.S. Cl. 356—432 **28 Claims**

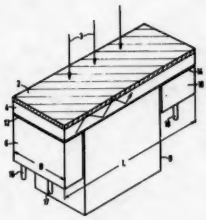
1. A sensor for detecting gases and ions comprising:

carrier means with at least one flat surface;

light source means with a light emitting surface for generat-

ing light and attached to the carrier means so that the light emitting surface of the source is in the same plane as the flat surface of the carrier;

light detector means with a flat detecting surface for detecting and quantifying light falling thereon, attached to the carrier means on the side of the carrier means opposite that to which the source means is attached, the detector being mounted so that its flat detecting surface is in the same plane as the flat surface of the carrier;



light wave guide means with at least one flat side mounted on the flat surface of the carrier, covering the light means, the detector means, and the flat surface with the waveguide's flat side, conveying light of various intensities from said source means to said detector means; and

thin sensor layer means attached to the waveguide means on the side of the waveguide opposite to the side attached to the carrier for analyzing the gases and ions by changing its absorptivity, and thereby altering light flow through the light waveguide means.

4,872,760

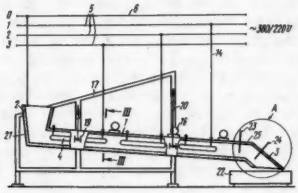
METHOD AND APPARATUS FOR PROCESSING A MIX, PREFERABLY CONCRETE MIX

Alexandr S. Arbeniev; Alexandr A. Ignatiev, both of Vladimir; Vitaly A. Zhilin, Moscow; Alexandr S. Melnikov, and Sergei F. Tomskikh, both of Vladimir, all of U.S.S.R., assignors to Vladimirsky Politekhnichesky Institut Glavnoe Territorialone Upravlenie Po Stroitelstvu Vo, Vladimir, U.S.S.R.

Continuation of Ser. No. 19,598, Feb. 26, 1987, abandoned. This application Jan. 18, 1989, Ser. No. 298,831

Int. Cl.[4] B28C *5/46*; B01F *11/00, 15/02, 15/06*

U.S. Cl. 366—7 **12 Claims**



1. A method for processing a mix, comprising:

causing the mix to move continuously within an elongated vessel having an inlet end and an outlet end so that said vessel is completely filled;

subjecting said mix to the action of oscillations during said movement;

defining a sealed zone within the vessel during said movement of said mix by sealing said inlet end and said outlet end;

heating at least a portion of said mix to at least 100° C. by causing electric current to flow in the mix during said movement of said mix within said sealed zone, whereby vapour is formed which penetrates the whole body of said mix to carry out rapid heating of all components of said mix.

4,872,761

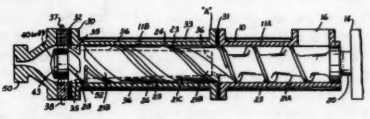
EXTRUSION APPARATUS

Paul Geyer, 15660 Tacoma, Detroit, Mich. 48025

Filed May 12, 1988, Ser. No. 194,070

Int. Cl.[4] B29B *1/06*

U.S. Cl. 366—79 **16 Claims**



1. An extrusion apparatus for the mixing and refining of rubber-like materials, either hot or cold feed, and some thermoplastic materials which comprises: an elongated cylindrical barrel member, an elongated rotor member, disposed coaxially in the interior of said barrel member and having an upstream and a downstream end, said rotor member provided with a concentric bore, at said downstream end in which a stationary screw-like member is coaxially disposed; means for relative rotational movement of said rotor member with respect to said barrel member and to said stationary screw-like member, for treating and axially advancing a process material; said barrel, rotor and screw-like members defining a feed end, a forcing zone, a mixing and refining zone, and a discharge end, interposed between said barrel ends; said rotor member being proven in said forcing zone with one or more extrusion grooves, capable of warming, pressurizing and transporting the process material to said mixing and refining zone, said rotor groove being a continuation of said forcing zone and being provided with a two part groove design, the leading portion of which consists of a deep, high lead, or longitudinal extrusion groove, which starts deep, at full extrusion capacity, and progressively decreases in capacity to essentially zero, at the trailing portion of said mixing and refining zone the trailing portion of said two part groove design connects with the downstream edge of said leading portion, by means of a shallow opening formed by the leading end of the groove the process material being directed in a circumferential direction, along the groove, which progressively diminishes in depth to a minimum depth restrictive opening or openings which retard the flow of oversize and less fluent process material, and direct the fine and fluent process material to ports leading radially inwardly to said concentric bore of said rotor member; said stationary screw-like member receives the process material from said ports and by means of an extruder groove configuration, reacting to the rotation of the rotor core bore, extrudes the process material out of said discharge end of the extruder.

4,872,762

METHOD AND APPARATUS FOR DETECTING DEFECTIVE PORTION ON INNER SURFACE OF PIPE

Toshio Koshihara; Rokurou Misawa; Yuzo Sagawa; Kimio Takehara; Yuji Matoba, and Koji Ishihara, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

Filed Aug. 2, 1988, Ser. No. 227,366

Claims priority, application Japan, Aug. 25, 1987, 62-209309; Aug. 25, 1987, 62-209310; Nov. 6, 1987, 62-279321; Dec. 3, 1987, 62-304418; Dec. 16, 1987, 62-190034; Jan. 13, 1988, 63-5397

Int. Cl.[4] G01N *25/72*

U.S. Cl. 374—5 **10 Claims**

1. A method of detecting a defective portion, including either an accumulation of foreign matter or a thinned out

region on the inner surface of a pipe, the outer surface of which is exposed, comprising:

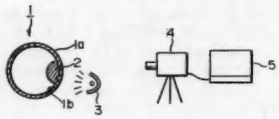
selectivity heating or cooling a pipe, the outer surface of which is exposed, from the side of the outer surface of the pipe so that a difference in temperature is produced between a portion of the outer surface of said pipe corresponding to a defective portion, including either an accumulation of foreign matter or a thinned out region on the inner surface of the pipe, and a portion of the outer surface of said pipe corresponding to a normal portion of the inner surface thereof;

then shooting the outer surface of said pipe by means of a thermal imaging system while said difference in temperature still remains on the outer surface of said pipe to obtain a thermal image of said difference in temperature; and

detecting said defective portion on the inner surface of said pipe by means of the thus obtained thermal image.

7. An apparatus for detecting a defective portion, including either an accumulation of foreign matter or a thinned out region on the inner surface of a pipe, the outer surface of which is exposed, comprising:

a guide prop (11), having a square cross section and a prescribed length, fitted releasably to the outside of a pipe, the outer surface of which is exposed, in parallel with the axis of the pipe;



a first pedestal (12) movable along one surface (11*a*) of said guide prop (11) in parallel with the axis of said pipe;

a heating mechanism (13), mounted on said first pedestal (12), for heating said pipe from the side of the outer surface of the pipe, said heating mechanism (13) comprising

a reflecting plate (21), having a concavely curved surface concentric with said pipe, and directed toward said pipe

a plurality of heaters (22) provided on said concavely curved surface of said reflecting plate (21), and

a reflecting plate driving mechanism (23) for return-moving said reflecting plate (21) along the direction of curvature thereof;

a first driving mechanism (14) for moving said first pedestal (12), together with said heating mechanism (13), along said one surface (11*a*) of said guide prop (11) in parallel with the axis of said pipe;

a second pedestal (15) movable along another surface (11*b*) of said guide prop (11) in parallel with the axis of said pipe;

a thermal imaging system (b 4), mounted on s-id second pedestal (15) toward said pipe, for shooting the outer surface of said pipe heated by said heating mechanism (13) to obtain a thermal image of said outer surface; and

a second driving mechanism (16) for moving said second pedestal (15), together with said thermal imaging system (b 4), along said another surface (11*b*) of said guide prop (11) in parallel with the axis of said pipe.

4,872,763

METHOD OF AND APPARATUS FOR MEASURING LIQUID

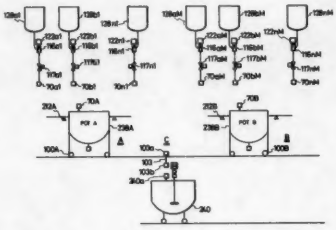
Noboru Higuchi; Keizo Matsui; Chuzo Kobayashi, and Shigeru Yamaguchi, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 2, 1988, Ser. No. 188,987

Claims priority, application Japan, May 1, 1987, 62-106412; May 12, 1987, 62-113430; May 14, 1987, 62-115891

Int. Cl.[4] B01F *15/04*

U.S. Cl. 366—160 **35 Claims**



13. An apparatus for measuring liquid and for mixing at least first and second liquids, the apparatus comprising:

(a) first means for containing the first liquids;

(b) second means for containing the second liquids:

(c) means for receiving respective amounts of the first and second liquids;

(d) first means for defining a flow path between said first containing means and said receiving means:

(e) second means for defining a flow path between said second containing means and said receiving means;

(f) first means for regulating flow-rate of the first liquid along said first flow path means to said means for receiving said first means for regulating having a degree of opening corresponding to the flow-rate;

(g) second means for regulating flow-rate of the second liquid along said second flow path means to said means for receiving said second means for regulating having a degree of opening corresponding to the flow-rate;

(h) means for obtaining an actual measured value corresponding to an amount of liquid received by said means f r receiving: and

(i) a control mechanism including:

(1) means for determining the degree of opening of the first and second means for regulating the degree of opening of said first means for regulating being based on the actual measured amount of liquid received by said means for receiving and a first set value and a degree of opening of said second means for receiving being based on the actual measured amount of liquid received by said means for receiving and a second set value and

(2) means for controlling the respective amounts of opening of the first and second means for regulating in response to the determinations of the respective amounts of opening.

4,872,764

COCKTAIL SHAKER

John W. McClean, Lakemba, Australia, assignor to Breville R & D Pty. Ltd., Pyrmont, Australia

Filed Jun. 27, 1988, Ser. No. 212,198

Claims priority, application Australia, Jun. 30, 1987, PI2790

Int. Cl.[4] B01F *7/22*

U.S. Cl. 366—251 **5 Claims**

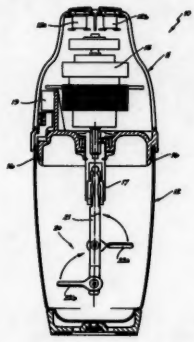
1. A beverage processing apparatus comprising:

an outer housing including an upper portion removably attached to a lower portion to form a closed processing vessel for containing a beverage mixture;

the upper portion including drive means to rotate a processing assembly which extends into the lower portion;

the processing assembly including a shaft adapted to be driven by said drive means;

at least one processing blade hingedly attached to the shaft so that the blade can upwardly fold against the shaft to a neutral position in which the blade lies alongside the shaft, on introduction of the shaft to a beverage mixture containing ice or other solid materials;



the blade including a portion lying in a plane tilted upwardly in relation to the axis and rotation of the shaft and operative to promote deflection of the blade towards the neutral position on the blade striking an obstacle during processing; and

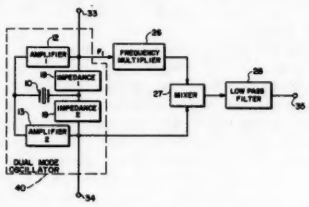
the blade being operative in use to extend substantially at right angles to the shaft under the influence of centrifugal force and to deflect into the neutral position in which the blade lies close alongside the shaft upon an adverse collision with solids in the beverage mixture.

4,872,765

DUAL MODE QUARTZ THERMOMETRIC SENSING DEVICE

Stanley S. Schodowski, Wayside, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 20, 1983, Ser. No. 487,560
Int. Cl.[4] H01L *41/10*
U.S. Cl. 374—117 **14 Claims**



1. Apparatus for sensing temperature comprising, in combination:

a single resonator means connected for generating at least two different C-mode harmonic frequency single as defined as F_A and F_B, wherein F_B has a higher harmonic number relative to F_A, the ratio of the higher harmonic number to the lower harmonic number being defined as N;

means for generating a third signal whose frequency is N times the frequency of F_A; and

means for generating a fourth signal which is the resultant of the subtraction of F_B from said third signal, wherein said fourth signal is used in the sensing of temperature.

4,872,766

TWO-COMPARTMENT PLASTIC BAG

Hugh G. Dancy, Hartsville, S.C., assignor to Sonoco Products Company, Hartsville, S.C.

Filed Nov. 18, 1988, Ser. No. 273,954
Int. Cl.[4] B65D *30/22, 33/08*
U.S. Cl. 383—10 **6 Claims**

1. A two-compartment plastic bag particularly adapted for carrying two large beverage bottles or like products and being characterized by a construction providing easy insertion and removal of such products into and out of said bag; said bag being fabricated from tubular flexible thermoplastic film and comprising in the flat condition thereof:

generally coextensive overlying front and rear wall portions integrally joined at longitudinally-extending side edges thereof;

a bottom portion including a heat seal extending transversely across and securing together bottom edges of said front and rear wall portions for closing said bottom portion;

a top handle portion including spaced-apart heat seals extending transversely across and securing said front and rear wall portions at a top area thereof, and a hand-receiving cutout formed through said front and rear wall portions between said spaced-apart heat seals and positioned generally medially of the side edges of said front and rear wall portions to form a medial grippable handle in said bag;

a heat seal extending generally longitudinally of and connecting said front and rear wall portions from said top handle portion toward said bottom portion and positioned generally medially between the side edges of said front and rear wall portions to define side-by-side compartments within said bag; and

an open mouth portion at the top of each of said compartments on each side of said top handle portion and being formed by respective oppositely curved cutouts of said front and rear wall portions and each extending downwardly from the top of said top handle portion and outwardly to the said respective side edges of said front and rear wall portions to form easy insert mouths for each said compartment of said bag.

4,872,767

BEARING SUPPORT

Malcolm H. Knapp, Lynnfield, Mass., assignor to General Electric Company, Lynn, Mass.

Filed Apr. 3, 1985, Ser. No. 719,606
Int. Cl.[4] F16C *27/00*
U.S. Cl. 384—99 **24 Claims**

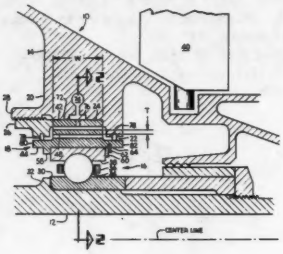
1. A bearing support comprising:

an annular first shell;

an annular second shell being coaxial with and spaced from said first shell for defining an annular space therebetween;

at least one elongated, arcuate circspring disposed in said

annular space and being substantially concentric with said first and second shells, said circspring having first and second opposing ends fixedly attached to said first and second shells, respectively; and



damping means including means effective for channeling a damping fluid into said annular space for cooperating with said circspring for damping vibration.

4,872,768

SWIVEL BEARING FOR BRAKING DEVICES

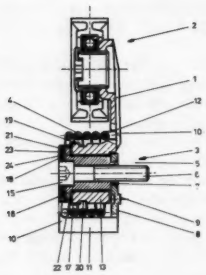
Manfred Brandenstein, Eussenheim; Roland Haas, Hofheim; Wolfgang Friedrich, and Gerhard Herrmann, both of Schweinfurt, all of Fed. Rep. of Germany, assignors to SKF GmbH, Schweinfurt, Fed. Rep. of Germany

Filed Nov. 22, 1988, Ser. No. 275,204

Claims priority, application Fed. Rep. of Germany, Dec. 11, 1987, 3742030

Int. Cl.[4] F16C *27/00*

U.S. Cl. 384—223 **6 Claims**



1. A swivel bearing for a braking device comprising a fixed internal machine part, a sleeve section rotatably mounted to said fixed internal machine part, a spring coupled between said machine part and said sleeve section for generating a relative swivel motion between said machine part and said sleeve section, and a damping element installed, a portion of said sleeve section and said machine part having radial friction surfaces, said internal machine part comprising a flange directed radially outward and having radial friction surfaces, a flange sleeve surrounding said flange axially and radially, means for securing said machine part axially and against torsion at said sleeve section, and said damping element adjoining at least one of the friction surfaces of the flange.

4,872,769

FRICTION BEARING SYSTEM FOR A RAPIDLY ROTATING SHAFT

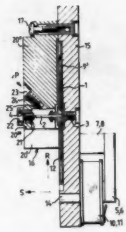
Hans Krause, Bad Nauheim; Rudi Röss, and Helmut Koch, both of Bruchköbel, all of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Hanau, Fed. Rep. of Germany

Filed Nov. 4, 1988, Ser. No. 267,245

Claims priority, application Fed. Rep. of Germany, Sep. 6, 1988, 3830181

Int. Cl.[4] F16C *35/10*; G02B *26/04*

U.S. Cl. 384—226 **5 Claims**



1. In an apparatus for measuring the optical absorption ability of a sample under analysis with an optical radiation source for projecting a beam against the sample, a chopper system for the periodical interruption of the measuring beam, a speed-regulated drive system, and a radiation detector for the measuring light affected by the sample, a friction bearing system for a rapidly rotating shaft comprising a chopper disk provided with light passage openings, a shaft affixed to the chopper disk and having pivots at two ends thereof, two bushes, a spider holding one bush and being affixed to a housing part holding the other bush, the spider being provided with a bore running at an angle to the shaft, the longitudinal axis of the bore intersecting the axis of rotation of the shaft, a longitudinally displaceable part and a magnet held in the bore on the longitudinally displaceable part, a ring of magnetic material which is disposed on the shaft, the magnet having a magnetic field acting on the ring of magnetic material.

4,872,770

ANTIFRICTION BEARING WITH SEAL ARRANGEMENT

Thorn W. Dickinson, Berlin, Conn., assignor to The Torrington Company, Torrington, Conn.

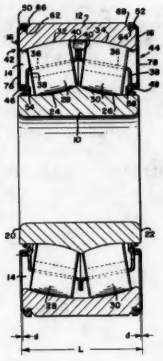
Filed Apr. 20, 1989, Ser. No. 340,739

Int. Cl.[4] F16C *33/72*

U.S. Cl. 384—484 **1 Claim**

1. A bearing comprising: an annular inner race; an annular outer race having an inside diameter greater than the outside diameter of the annular inner race thereby providing an inner race–outer race annulus, both end surfaces of each race extending radially to the axis of the bearing, each end surface of the outer race being spaced axially inwardly from its corresponding inner race end surface, the axial end portions of the outer race having a smaller outside diameter than the outside diameter of the remainder of the outer race, each smaller outside diameter of the outer race having an annular groove; and a pair of axially spaced annular sealing members sealing the inner race–outer race annulus, each sealing member having a metal part consisting of an axially inwardly extending radially inside portion radially spaced from the outside periphery of the inner race, and an axially extending radially outside portion extending over the corresponding smaller outside diameter of the outer race interconnected by a portion having its axially outside surface extending along the same radial plane as the corresponding inner race end surface; a rubber seal lip molded on the metal part inside portion and in contact with the outside periphery of the inner race; and a rubber insert molded on the

metal part outside portion, the rubber insert having an outside diameter substantially the same as the diameter of the remainder of the outer race, the rubber insert also having an annular



portion fitting into said groove whereby the rubber insert is locked in the annular groove when the bearing is inserted into the bore of a housing.

4,872,771

BEARING

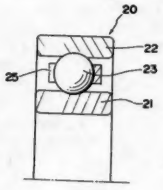
Hiroshi Ueno; Tomoaki Satomi, and Teruo Yoshida, all of Osaka, Japan, assignors to Koyo Seiko Co., Ltd., Osaka, Japan

Division of Ser. No. 78,120, Jul. 27, 1987, abandoned. This application Dec. 16, 1988, Ser. No. 285,427

Claims priority, application Japan, Jul. 29, 1986, 62-117399[U]; Jun. 24, 1987, 62-156784

Int. Cl.[4] F16C *33/32, 33/62*

U.S. Cl. 384—492 **8 Claims**



1. A bearing, comprising:

at least two rings formed of a metal of a first hardness; and

a plurality of rolling elements in between said at least two rings as bearing members, said rolling elements formed of calcined carbon and provided with a second hardness higher than said first hardness.

4,872,772

THERMAL RECORDER FOR PRINTING DOT PATTERNS HAVING HIGHER DENSITY AT ENDS OF PATTERN

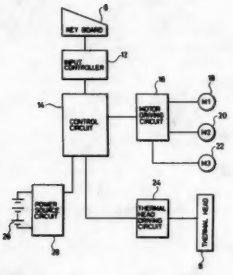
Takahiro Tsukamoto, Mitaka, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 9,570, Jan. 30, 1987, abandoned, which is a continuation of Ser. No. 861,123, May 7, 1986, abandoned, which is a continuation of Ser. No. 704,936, Feb. 25, 1985, abandoned. This application Dec. 5, 1988, Ser. No. 283,058

Claims priority, application Japan, Mar. 1, 1984, 59-37337; Jun. 22, 1984, 59-127395

Int. Cl.[4] B41J *3/02*

U.S. Cl. 400—120 **10 Claims**



1. A printer comprising:

a thermal head having a plurality of heat generating elements for providing dots on a recording medium;

generating means for generating dot patterns to be recorded on the recording medium by said plurality of heat generating elements;

control means for changing the relative position of the recording medium and said thermal head by an amount smaller than the size of said plurality of heat generating elements; and

driving means for selectively driving said plurality of heat generating elements so as to record dots at the ends of the dot patterns with a higher print density than other dots of the dot patterns.

4,872,773

PRINTING WHEEL DISCRIMINATING APPARATUS

Hiroyuki Ueda, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 113,433, Oct. 28, 1987, abandoned, and Ser. No. 804,896, Dec. 5, 1985, abandoned. This application Mar. 8, 1989, Ser. No. 320,906

Claims priority, application Japan, Dec. 10, 1984, 59-259192

Int. Cl.[4] B41J *1/30*

U.S. Cl. 400—144.2 **5 Claims**

1. A printing wheel discriminating apparatus for discriminating a printing wheel having a plurality of areas for identifying data, a plurality of type faces around a rotating outer area thereof at specific angles and a reference position, comprising:

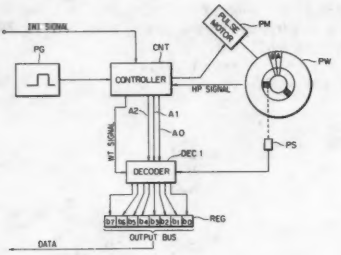
driving means for rotating said printing wheel, said driving means rotating said printing wheel stepwisely during the wheel discriminating process, with the angle of each stepwise rotation being larger than said specific angles and the entire periphery of said printing wheel being equally divided into predetermined angles which correspond to the angle of each stepwise rotation;

detecting means for detecting said area provided on said printing wheel;

a first transferring line for transferring a result of detection by said detecting means;

a second transferring line, independent from said first transferring line, for transferring a reference signal representing the reference position of said printing wheel;

memory means for storing the result of detection by said detecting means at each predetermined angular position, said memory means containing a number of memory areas corresponding to a number of said areas, and storing said identifying data, if present;



control means for rotating said printing wheel in units of predetermined angles on the basis of the reference signal transferred through said second transferring line, and outputting the contents of said memory as identifying data; and

means for defining a printing position of said printing wheel, based on the identifying data output from said control means.

4,872,774

INSTRUMENT FOR WRITING AND DRAWING

Walter Rosso, Turin, Italy, assignor to R.P.R. Righella di W. Rosso & C. S.a.s., Turin, Italy

Filed May 4, 1988, Ser. No. 190,181

Claims priority, application Italy, Jan. 13, 1988, 52821/88[U]

Int. Cl.[4] B43K *27/00, 27/12*

U.S. Cl. 401—29 **2 Claims**

1. A writing and drawing instrument comprising a main body of elongate shape having an elongate axis and a first and a second writing end, first and second auxiliary bodies each having an elongate shape and being provided at its respective ends with a writing element, each of said auxiliary bodies being mounted to rotate about an axis transverse to said elongate axis in order to allow the alternative positioning of one of the two writing elements at one of the writing ends of the main body, each of the auxiliary bodies being able to slide longitudinally with respect to the main body between a first position in which the writing element positioned at the writing end is covered by the main body and a second position in which the writing element projects externally from the main body thereby allowing writing, the main body having two slots in which the respective auxiliary body is slidably and rotatably mounted, each auxiliary body being provided with grooved lateral surfaces cooperating with stop means designed to prevent the undesired rotation of the auxiliary body with respect to the main body, and each auxiliary body having hinge means cooperating with the main body and ramp means able to cooperate with the stop means for causing resilient lateral deformation of the main body thereby disengaging the hinge means to allow and guide the axial translation of the auxiliary body following the disengagement of the hinge means.

4,872,775

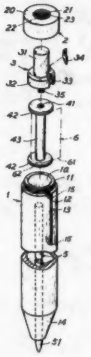
NOTE PAPER-HOLDING PEN

Shi-Lung Chang, P.O. Box 10160, Taipei, Taiwan

Continuation-in-part of Ser. No. 66,221, Jun. 24, 1987, abandoned. This application Jan. 6, 1988, Ser. No. 141,513

Int. Cl.[4] B43K *29/12*

U.S. Cl. 401—52 **4 Claims**



1. A slip-holding pen comprising:

a penholder formed as a generally longitudinal cylinder having an inner hollow bore portion and having a male-threaded portion formed on a top end of said penholder, a longitudinal slit formed in an upper portion of said penholder and a lower cap fixed on a lower end of said penholder limiting a lower end of a central stick selected from a pencil lead and an inner ink reservoir of a ball pen;

an upper cap having an upper round cover formed with a central hole therein, a female-threaded portion formed in a lower perimeter of the cap engageable with the male-threaded portion of said penholder, and a plurality of ratchet teeth circumferentially formed on a cylindrical wall inside said cap; a rotating knob having a stem portion rotatably mounted in said central hole of said cap, a round disk secured to said stem portion having a recess inserted with a spring pawl therein, and a male-threaded rod portion protruding downwardly from said round disk, said round disk with said spring pawl clickingly rotatably engageable with said ratchet teeth of said cap to allow a single-direction rotation of said knob;

a slip reel including a central axle rotatably mounted on an upper stick portion of said central stick, two round flanges disposed on an upper end and a lower end of said axle rotatably mounted in the bore portion of said penholder, and a female-threaded hole formed on the upper flange engaged with said male-threaded rod portion of said knob; and

a slip roll having a rolled paper strip wound on said axle of said reel, and operatively unrolled to be released through said slit in said penholder,

the improvement which comprises:

said longitudinal slit includes:

a pair of longitudinal edges generally tangential to a circumferential surface of said bore portion of said pen holder, a pair of wedge portions respectively formed on two opposite ends on a first longitudinal edge of said longitudinal slit approximate and corresponding to two opposite ends of said slip roll; and

said slip roll having two opposite ends of said roll coated and bonded by an adhesive, whereby upon an unwinding rotation of said knob, a slip paper may be torn from said slip roll and released through said slit.

4,872,776

LEAD CHUCK OF MECHANICAL PENCIL

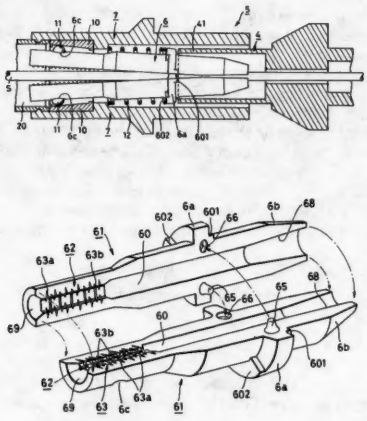
Hidehei Kageyama; Yoshihide Mitsuya, and Yoichi Nakazato, all of Kawagoe, Japan, assignors to Kotobuki & Co., Ltd., Kyoto, Japan

Filed Oct. 30, 1987, Ser. No. 114,745

Claims priority, application Japan, Oct. 30, 1986, 61-167356[U]; Jun. 30, 1987, 62-100526[U]; Sep. 17, 1987, 62-140862[U]

Int. Cl.[4] B43K *21/22*

U.S. Cl. 401—65 **9 Claims**



1. A lead chuck of a mechanical pencil in which said chuck is completely divided along a lead insertion hole into two chuck members with mutually adjacent substantially planar inner surfaces and mutually oppositely facing semi-circumferential outer surfaces, such that lead can be held therebetween by a lead holding part, disposed at a forward end of said chuck members, by which the lead is fed out by way of expansion of a rearward extremity end of said chuck upon performance of a knocking operation, the improvement comprising:

a flange projected semi-circumferentially about a rear portion of said semi-circumferential outer surface of each of said chuck members, said flange having a forward face and a rearward face;

a first stepped portion projected forwardly from said forward face of each of said semi-circumferential flanges and extending outwardly from a central portion of said semi-circumferential outer surface of each of said chuck members the same radial distance as does each said flange, for receiving a rear end of a resilient member against a front face of each of said first stepped portions of said semi-circumferential flanges;

second stepped portions, each being projected rearwardly from and formed integral with said rear face of each said semi-circumferential flange and projecting outwardly from said semi-circumferential outer surface of each said chuck member, for receiving an extremity end of a receiving element;

such that when said receiving element is pressed against said second stepped portions, said first stepped portions are pressed against a biasing force of said resilient member and cause a radially outward motion of said extremity end of each said chuck member to thereby result in expansion of said lead chuck and release of said lead.

8. A lead chuck of a mechanical pencil in which a chuck member is completely divided along a lead insertion hole into two chuck segments with mutually adjacent inner surfaces and diametrically opposite semi-circumferential outer surfaces, and forms part of a lead feeding mechanism, said chuck member including a lead holding part formed at an extremity end thereof, and means for expanding said lead holding part during advancing movement of said chuck member when an extremity end of a receiving member presses said chuck member forwardly against a biasing force of a resilient member installed between said chuck member and a sleeve of said lead feeding mechanism, to perform a feeding of said lead, wherein;

said lead holding part is constructed such that corners of raised portions positioned oppositely against both sides of a shallow groove are provided with several first lead holding teeth projected such that, when the sliding surfaces of each chuck segment are facing each other, said first teeth of one chuck segment face said first teeth of the other chuck segment as well as face corresponding first teeth on opposite corners of the same chuck segment, the first teeth are abutted against the outer periphery of the lead along four longitudinal lines thereon when said lead is gripped and the lead is held under a condition in which each lead abutment portion of the first teeth is point contacted; and

second teeth raised from a bottom surface of said shallow groove and having a lower tooth height than that of said first teeth are projected and formed alternately between each of the several first teeth arranged along an axial direction of the mechanical pencil in order to hold the lead with said first teeth and to contact the outer periphery of the lead with said second teeth when said first teeth cut into the outer periphery of said lead and produce a lead thinning phenomenon during prolonged use of the same lead;

such that a new surface of the outer periphery of said lead which has not been cut by said first teeth is held by said second teeth and provides a holding force in addition to that provided by said first teeth when said lead thinning phenomenon occurs.

4,872,777

MEANS AND METHOD OF ERADICATING IMAGES FROM ELECTROSTATIC MEDIA

Gary R. Dalbke, Wooddale, Ill., assignor to Teledyne Industries, Inc., Los Angeles, Calif.

Filed Dec. 3, 1987, Ser. No. 128,348

Int. Cl.[4] B41J *27/12*; C09D *9/00*; B43L *19/00*; B08B *7/00*

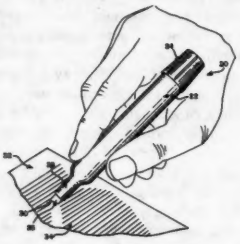
U.S. Cl. 401—199 **8 Claims**

1. A device for removing electrostatic images affixed to various mediums in an electrostatic copier, comprising:

a container;

a felt-like tip member secured to said container and communicating internally with the contents thereof; and,

an image eradicator solution of acetone in water contained within said container to be dispensed therefrom through



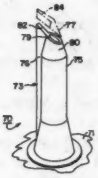
said tip member, said eradicator solution containing at least about 85% by weight of acetone.

4,872,778

COATING DISPENSING CARTRIDGE AND SPOUT THEREFOR

William J. Longo, 35865 Timber Ridge La., Willoughby, Ohio

Filed Nov. 16, 1987, Ser. No. 120,992
Int. Cl.[4] B05C *5/02*
U.S. Cl. 401—266 **11 Claims**



1. A spout for dispensing flowable materials from a container to coat a surface, comprising:

a nozzle connected at one of its ends in fluid communication with the container and having means defining an orifice at its opposite end inclined at an angle relative to the axis of the nozzle, said nozzle being substantially tubular, a single guide means extending transversely from one side of said nozzle;

the entire surface contacting end of said guide means being generally flat with a guide surface inclined at an angle relative to the axis of the nozzle end disposed adjacent to and substantially co-planar with said angled orifice, whereby said guide means is the primary support of said container with nozzle during a dispensing operation of said container.

4,872,779

JOINT DEVICE OF STRUCTURE MEMBER

Katsuhiko Imai, Ashiya, Japan, assignor to Kawatetsu Kenzai Kogyo Kabushiki Kaisha, Hyogo, Japan

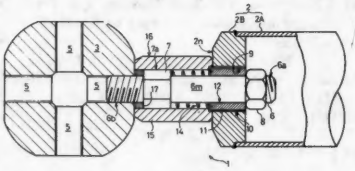
PCT No. PCT/JP87/00137, § 371 Date Mar. 29, 1988, § 102(e) Date Mar. 29, 1988, PCT Pub. No. WO88/01323, PCT Pub. Date Feb. 25, 1988
PCT Filed Mar. 4, 1987, Ser. No. 187,662
Claims priority, application Japan, Aug. 19, 1986, 61-193059
Int. Cl.[4] F16D *1/00*
U.S. Cl. 403—171 **21 Claims**

1. A device for connecting an end of an elongate pipe-like structure member having an internally threaded end, ending at a first contact surface, to a connector node having an internally threaded aperture ending at a second contact surface, comprising:

a bolt having first and second end portions, formed to have oppositely spiralled threads, the threads of said second end portion being adapted to engage with said threaded node aperture, and intermediate therebetween a cylindrical portion and a torque-transmitting portion;

an annular cylindrical bolt-support member, having an internal bore adapted to slidingly receive therethrough said first threaded portion and said cylindrical portion of said bolt, provided along a portion of its length with an external thread adapted for engagement with the internal threads of said structure member end;

a nut means for engaging said first threaded end portion of the bolt, selected to be diametrically larger than said



internal bore of the bolt-support member but smaller than a diameter of the internal threads of the structure member end; and

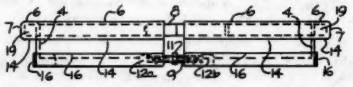
a sleeve member having a first end with a first end surface for contacting the first contact surface and a second end with a second end surface for contacting the second contact surface, of the structure member and the node respectively, an internal bore of a cross-section shaped to slidingly receive said torque-transmitting portion of the bolt in torque-transmitting engagement therewith, and an external surface formed to be engaged thereat by a suitable sleeve-engaging tool means for applying torque.

4,872,780

MANHOLE COVER SUPPORT WITH BOX FLANGING

Harold M. Bowman, 18867 N. Valley Dr., Fairview Park, Ohio 44126

Continuation-in-part of Ser. No. 76,668, Jul. 23, 1987, and Ser. No. 20,573, Jun. 1, 1988. This application Jun. 15, 1988, Ser. No. 207,185
Int. Cl.[4] E02D *29/14*
U.S. Cl. 404—26 **32 Claims**



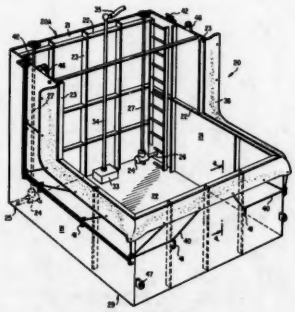
1. A manhole cover support for emplacing into and raising the effective grade of an existing manhole cover receiving structure that has an upwardly-extending shoulder surface, the cover support comprising a base portion with a seat portion, and a lateral keeper portion that is integral with the base portion, the transverse wall thickness of the keeper portion being substantially less than the corresponding transverse thickness of the base, the outer wall of the base portion facing said shoulder surface, the keeper portion projecting upwardly from the seat, the cover support including a hollow stiffening wale that is integral with and substantially coextensive with the top of the keeper portion.

4,872,781

OPEN TOP FLOATABLE BARGE REPAIR BOX WITH BARGE TO BOX SEALING SYSTEM

Joseph B. Childress, 6630 River Pl., Gulf Shores, Ala. 36542

Filed Nov. 18, 1988, Ser. No. 273,451
Int. Cl.[4] E02D *23/02*; B63C *11/00*
U.S. Cl. 405—12 6 Claims



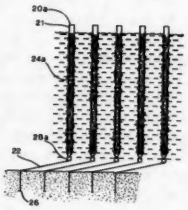
1. A watertight floodable barge repair box comprising an L-shaped athwartship construction having a vertical leg and horizontal foot, the top of said vertical leg being open, an open front wall on said leg and an open top wall on said foot, a flexible waterproof unitary contiguous flexible membrane strip one edge of which is secured to said box about the open front wall on said leg and the open top wall of said foot and said strip being of a width to overlap the connection between the barge hull and barge repair box when said barge is in place in a body of water between said leg and said foot, cable attaching means connected between said barge and said barge repair box to maintain said barge in place against said repair box, and tethering means connected between the free edge of said contiguous flexible waterproof membrane and said work box to keep the free edge of said membrane from being engaged between said barge and work box during securing of the barge to the work box which is releasable to permit the waterproof membrane to form a watertight seal between the barge and work box when the work box is secured tightly against the barge prior to pumping the water from the work box.

4,872,782

ARTIFICIAL SUBSTRATES FOR MARINE BIOMASS ENHANCEMENT AND WAVE ENERGY ABSORPTION

Rodolphe Streichenberger, 101 Dahlia Ave., Corona Del Mar, Calif. 92625

Filed Apr. 7, 1987, Ser. No. 35,449
Int. Cl.[4] E02B *3/00*; A01K *61/00*
U.S. Cl. 405—24 21 Claims



1. An artificial substrate for increasing biomass in a body of water comprising:

a plurality of substrate units, each of said substrate units comprising a buoyant tube connected by a flexible line to a bottom mooring and separated from adjacent substrate units so as to achieve a predetermined implantation density; and

sessile organisms attached to each of said substrate units.

4,872,783

BALANCED BUOYANCY CONTROL DIVING GEAR

Alden T. Greenwood, R.F.D. Box 213, Greenville Rd., Mason, N.H. 03048

Filed Jun. 16, 1988, Ser. No. 207,236
Int. Cl.[4] B63C *11/08*
U.S. Cl. 405—186 7 Claims

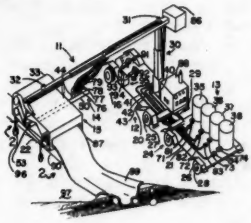
1. A buoyancy control system for diver's gear comprising at least an inflatable outer cell having a flexible wall mounted in said gear, means for inflating said outer cell to increase the volume thereof, a deflatable inner cell also having a flexible wall disposed within said outer cell, means for deflating said inner cell and means connecting said flexible wall of said inner cell to said flexible wall of said outer cell at spaced points for common movement thereof whereby deflating of said inner cell reduces the volume of said outer cell and the buoyancy of said diver's gear.

4,872,784

DITCH LINING APPARATUS AND METHOD AND PRODUCT THEREFROM

Le Roy Payne, 3300 Nicholas La., Molt, Mont. 59057

Filed Aug. 23, 1988, Ser. No. 235,205
Int. Cl.[4] E02B *3/12*; E01C *23/03*
U.S. Cl. 405—270 18 Claims



1. Mobile continuous ditch lining apparatus including a supporting portion, a raw material supplying portion, a mixing portion, a matrix forming portion and a control portion; said supporting portion including at least one base section, carriage means depending from said supporting portion including at least one transverse axle assembly with wheels mounted on free ends thereof; said raw material supplying portion including a plurality of reservoirs disposed on said supporting portion, said reservoirs being connected independently with said

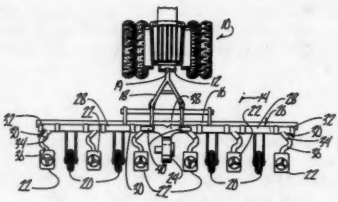
mixing portion through flexible conduit means, blanket support means extending from said supporting portion; said mixing portion including an elongated chamber mounted on said supporting portion adjacent said blanket support means, a plurality of deflector sections within said mixing chamber spaced along the length thereof; said matrix forming portion including elongated mixture delivery means disposed closely adjacent to said mixing chamber and substantially parallel to said blanket support means, pressure applying means disposed subsequent to said mixture delivery means; said control portion including pump means, valve means and flow monitoring means disposed along the length of each of said conduit means, drive means advancing a continuous porous blanket through said matrix forming portion, programmable memory means and actuating means responsive thereto respectively controlling and activating said pump means, valve means and drive means; whereby a solidifiable liquid mixture is applied to said porous blanket as it passes through said matrix forming portion and the combination immediately laid into a ditch continuously while the liner is deformable and conforming it to the ditch so it will be set in the configuration thereof.

4,872,785

SHUT-OFF MEANS FOR AIR-ACTUATED PLANTER

Timothy L. Schrage; Jay T. Schrage, and Lester Schrage, all of 420 Locust St., P.O. Box 565, Allison, Iowa 50602

Filed Jan. 22, 1988, Ser. No. 146,860
Int. Cl.[4] B65G *53/40*
U.S. Cl. 406—155 **9 Claims**



1. A seed planter, comprising:

a frame device including an elongated frame member;

means for securing said elongated frame member to the rearward end of a tractor;

a plurality of air-actuated row planter units secured to said elongated frame member in spaced relation;

an elongated air conduit secured to and extending in parallel relationship to said elongated frame member;

an air fan means on said frame device and in communication at a juncture with said air conduit for moving air through said air conduit;

means connecting said row planter units to said air conduit so that air moving in said air conduit can operate said row planter units;

a plurality of air valve means in said air conduit and adapted to open and close different segments of said air conduit to the flow of air;

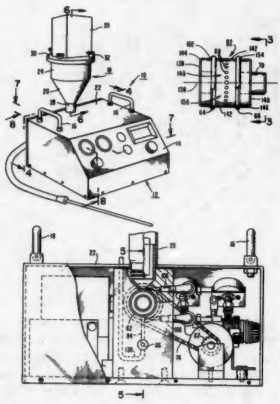
and control means operatively connected to said air valve means for independent operation of said air valve means whereby some of said row planter units can be selectively closed to air flow while other of said row planter units can be open to air flow to permit seed planting by some of said planter units while rendering inoperative other of said seed planter units.

4,872,786

SOLID PARTICULATE AEROSOL GENERATOR

Thomas M. Braden, 5737-G Arrow Hwy., Montclair, Calif. 91763

Filed Apr. 6, 1987, Ser. No. 34,914
Int. Cl.[4] B65G *53/46, 53/08*
U.S. Cl. 406—68 **11 Claims**



1. A solid particulate aerosol generator for accurately dispersing a predetermined quantity of a solid particulate material having a mean diameter less than about 0.2 microns so as to provide a highly precise aerosol concentration of the particulate material which is useful in the testing of HEPA filters, the solid particulate aerosol generator comprising:

(a) a reservoir for storing the solid particulate material;

(b) a wheel rotatable about a horizontal axis of rotation, the wheel being disposed below and in fluid communication with the reservoir, the wheel being a right circular cylinder having a first end surface, a second end surface and a continuous radial surface, the radial surface abutting the first end surface along a first radial edge and the radial surface abutting the second end surface along a second radial edge, the radial surface having an upper radial surface moiety above the axis of rotation and a lower radial surface moiety below the axis of rotation;

(c) a first o-ring groove disposed radially around the radial surface proximate to the first radial edge and a second o-ring groove disposed radially around the radial surface proximate to the second radial edge, the first o-ring groove and the second o-ring groove being disposed in parallel planes which are perpendicular to the axis of rotation;

(d) a first o-ring disposed within the first o-ring groove and a second o-ring disposed within the second o-ring groove;

(e) at least four pockets disposed evenly around the radial surface between the o-ring grooves, each pocket having a predetermined volume and a single open side;

(f) scraping means disposed proximate to the radial surface upper moiety for scraping excess solid particulate material from above the single open side of each pocket;

(g) a conveying conduit disposed below and in fluid communication with the radial surface lower moiety; and

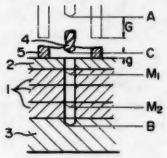
(h) a venturi mixer having a throat in fluid communication with the conveying conduit and having an inlet side and a delivery port.

4,872,787

METHOD OF DRILLING PRINTED CIRCUIT BOARD

Kunio Arai, Atsugi; Hiromi Nishiyama, Ebina; Hiroshi Aoyama, Tokyo, and Yasuhiko Kanaya, Machida, all of Japan, assignors to Hitachi Seiko Ltd., Tokyo, Japan

Filed Oct. 9, 1987, Ser. No. 106,439
Claims priority, application Japan, Dec. 19, 1986, 61-301285
Int. Cl.[4] B23B *35/00, 4/00, 47/00*
U.S. Cl. 408—1 R 20 Claims



1. A method of drilling a hole in a printed circuit board in which stacked printed circuit boards are fixed by a pressure foot for the drilling, comprising the steps of:

setting a drill start position at which said pressure foot is not in contact with said printed circuit boards, a pulled-out position at which the pressure of said pressure foot acts on said printed circuit boards and at which a drill bit is located just above said stacked printed circuit boards, a plurality of intermediate positions successively located at certain points in a depthwise direction of said hole, and a hole bottom position at which the drilling of said hole is completed;

setting and entry feed rate at which said drill bit initially drills said printed circuit boards, a drilling feed rate which ensures satisfactory drilling, and a rapid feed rate which is faster than said drilling feed rate;

repeating, after said drill has been fed from said drill start position to a first intermediate position at said entry feed rate, a cycle which includes a step of feeding said drill from said first intermediate position to said pulled-out position at said rapid feed rate and a step of feeding said drill from said pulled out position to a next intermediate position at said drilling feed rate; and

returning said drill to said drill start position at said rapid feed rate after said drill has reached said hole bottom position.

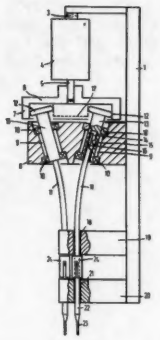
4,872,788

MULTI-SPINDEL DRILLING MACHINE

Gerrit C. Koese, Steijnstraat 6, 953 RE Baflo, Netherlands

Continuation of Ser. No. 137,598, Dec. 24, 1987, abandoned.
This application Feb. 1, 1989, Ser. No. 304,650
Int. Cl.[4] B23B *39/16*
U.S. Cl. 408—46 18 Claims

1. A multi-spindle drilling machine for simultaneously drilling a plurality of holes, in particular suitable for drilling a plurality of tiny, closely-spaced holes, characterized by a cup-shaped drivable drive wheel, the inner wall of the drive wheel coacting with a plurality of friction wheels, each connected to a flexible spindle, whose ends away from the friction wheels extend through bores in a spaced apart spindle guide block, which bores correspond with opposite bores in a drill guide block and are disposed in accordance with the pattern of the holes to be drilled, coupling means being provided in the space between the drill guide block and the spindle guide block for



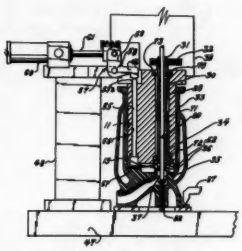
connecting the shanks of drill bits placed in the bores of the drill guide block to the spindles.

4,872,789

METHOD AND APPARATUS FOR MACHINING VALVE SEATS AND VALVE STEM GUIDES IN A DEEP-WALLED ENGINE MONOBLOCK WORKPIECE

Nathaniel L. Field, Northville, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 137,994, Dec. 28, 1987, Pat. No. 4,836,719.
This application Apr. 3, 1989, Ser. No. 331,722
Int. Cl.[4] B23B *41/12*
U.S. Cl. 408—79 8 Claims



1. An apparatus for machining valve seats at the end of an axially deep cavity of a workpiece having an axially clampable surface adjacent one or more of said valve seats, the apparatus comprising:

(a) a rotary spindle support having a nonrotatable housing effective to fit closely to the interior of the cavity within a tolerance of 0.01 inches and effective to move along the axis of the cavity, a first rotary spindle carried within a central bore of said housing and movable axially with the housing;

(b) a cutting tool carried by the lower extremity of said spindle for machining said valve seats at the end of said workpiece cavity; and

(c) clamping means for securing said housing against radial movement when the extremity of the spindle of said housing is located proximate to said valve seat but allowing limited axial movement of the housing and spindle to

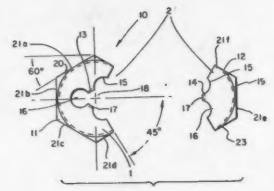
permit machining contact between the cutting tool and workpiece.

4,872,790

SEGMENTED DIE

Wade Sibole, 15704 Livingston Rd., Accokeek, Md. 20607

Filed Dec. 18, 1987, Ser. No. 134,905
Int. Cl.[4] B23G *5/00*
U.S. Cl. 408—221 **3 Claims**



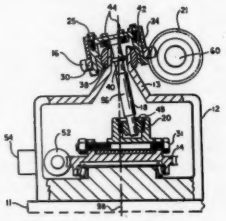
1. A die comprising at least two completely separable complementary members interfitting each other, each of said members having an inner surface defining at least one lobe with recesses positioned on either side thereof, said lobes having thread cutting surfaces thereon whereby the lobes and recesses define an annular inner surface and a substantially contiguous outer surface when the members are mated together, said outer surface being formed of a plurality of flat contiguous wrench-engaging surfaces, a recess formed and extending about the entire wrench-engaging surfaces, an expansible coiled spring of annular configuration seated in said recess maintaining said members in mating engagement allowing the members to separate out of contact with one another to permit their passing over an element to be threaded and thereafter to be re-engaged therewith, whereafter the wrench-engaging surfaces can be engaged for turning the same.

4,872,791

METHOD OF FORMING CROWNED GEAR TEETH

John H. Crankshaw, Erie, Pa., assignor to Dynetics, Inc., Erie, Pa.

Filed Jun. 27, 1988, Ser. No. 211,865
Int. Cl.[4] B23F *9/00*
U.S. Cl. 409—12 **9 Claims**



1. A method for making a gear coupling designed to connect a first rotary member to a second rotary member to operate at misalignment at a predetermined angle comprising:

providing a first gear having teeth,

providing a gear cutting machine having cutting means thereon that is adapted to simulate the teeth of said first gear,

providing gear support means on said gear cutting machine,

supporting a gear blank to be shaped into a second gear on said gear support means,

engaging said blank with said cutting means and simultaneously moving said gear blank and said cutting means relative to one another substantially in the same manner that said first gear and said second gear are intended to move when operated as a misalignment coupling at said predetermined angle of misalignment,

whereby said blank is formed into a crowned tooth gear having the same number of teeth as said first gear,

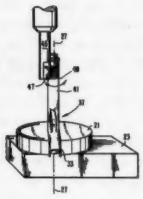
installing said first gear with said second gear thereby forming a coupling for operation at said predetermined angle of misalignment with substantially no interference between said teeth on said first gear and the teeth cut in said second gear.

4,872,792

PISTOL GRIP CHECKERING

Kim M. McCubbin, Longrove, Iowa, assignor to Springfield Armory, Inc., Geneseo, Ill.

Filed Dec. 8, 1988, Ser. No. 281,806
Int. Cl.[4] B23C *9/00*
U.S. Cl. 409—131 **18 Claims**



1. A method for checkering the convex face of a pistol grip frame, comprising the steps of:

mounting a metal pistol grip frame to a rotatable holder with the convex face of said pistol grip exposed;

mill cutting a successive series of parallel, generally lateral cuts around the convex face of said pistol grip frame by rotating said rotatable holder about a holder pivot axis, wherein said pistol grip frame is rotated with respect to a mill cutter; and

mill cutting a successive series of parallel, generally longitudinal cuts along the convex face of said pistol grip frame by moving said pistol grip frame and a mill cutter longitudinally with respect to each other, wherein a pattern of cut checkering is formed in the convex face of said pistol grip frame.

4,872,793

METHOD OF AND APPARATUS FOR SERRATING A STEERING WHEEL

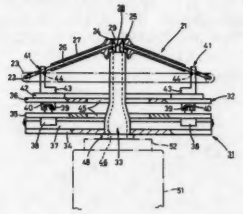
Takehiro Minagawa; Toshio Stou; Masao Miyata, all of Fuji; Kenji Nemoto, and Kuninobu Uchida, both of Sayama, all of Japan, assignors to Nihon Plast Co., Ltd., Shizuoka and Honda Giken Kogyo Kabushiki Kaisha, Tokyo, both of, Japan

Filed Oct. 4, 1988, Ser. No. 252,998
Claims priority, application Japan, Oct. 7, 1987, 62-252661
Int. Cl.[4] B23D *37/10*
U.S. Cl. 409—244 **7 Claims**

1. A method serrating a steering wheel by setting the steering wheel on a serrating broaching machine, inserting a serrating broach into a through hole defined in a boss of the steering wheel, and then pulling the serrating broach with a broach chuck gripping the serrating broach to cut serrations on an inner surface of the through hole in the boss, said method comprising the steps of:

positioning said steering wheel horizontally movably and nonrotatably in a prescribed angular orientation on said broaching machine while placing said boss on a holder of said broaching machine;

inserting the serrating broach through said through hole in said boss into said holder of the broaching machine while holding said serrating broach in a prescribed angular orientation around the axis thereof with respect to said broach chuck; and



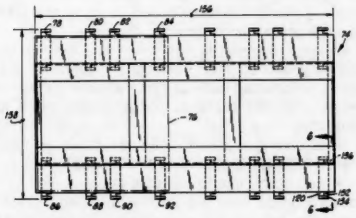
pulling the serrating broach from said boss with said broach chuck gripping said serrating broach to cut serrations on the inner surface of said boss.

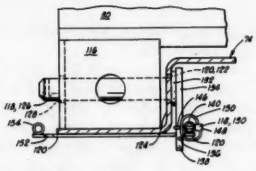
4,872,794

TANK MOUNTING APPARATUS

Gail F. Davis, and Robert L. Baker, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed May 27, 1988, Ser. No. 199,970
Int. Cl.[4] B61D *45/00*
U.S. Cl. 410—54 **10 Claims**





1. A tank mounting assembly, comprising:

a tank having a plurality of tank legs extending downward therefrom;

a mounting rack having a plurality of mounting positions defined thereon for receiving said tank legs, said mounting rack including at least one first pin receiving hole disposed through a substantially vertical wall of said rack and aligned with at least one second pin receiving hole disposed through each of said tank legs, said mounting rack further having at least one notch defined therein and associated with said first pin receiving hole;

a connecting pin received through said aligned first and second pin receiving holes, said connecting pin having a locking bar fixedly attached to one end thereof and extending radially therefrom and received in said notch of said mounting rack; and

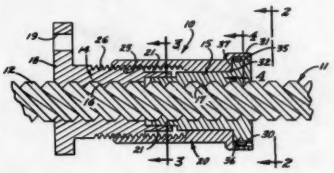
pin retainer means, connected to said rack, for retaining said locking bar in said notch and thereby retaining said connecting pin in said first and second pin receiving holes.

4,872,795

NUT ASSEMBLY WITH ROTATABLE SLEEVE FOR TAKING UP BACKLASH

Evy P. Davis, Crystal Lake, Ill., assignor to Dana Corporation, Toledo, Ohio

Filed Sep. 9, 1988, Ser. No. 243,332
Int. Cl.[4] F16B *37/00*; F16H *55/18*
U.S. Cl. 411—433 **9 Claims**



1. A nut assembly adapted to be threadably connected with a screw and movable axially relative to the screw as an incident to relative rotation between the nut assembly and the screw, said nut assembly comprising first and second nuts disposed end-to-end with one another and having threads adapted to mate with the thread of the screw, connecting means coupling said nuts against relative rotation while permitting the nuts to move axially relative to one another, a sleeve telescoped with said nuts and having one end portion threadably connected to said first nut whereby said sleeve moves axially relative to said nuts when said sleeve is rotated relative to said nuts, coacting means on said second nut and on the other end portion of said sleeve and engaging one another in such a manner as to tend to force said second nut axially away from said first nut when said sleeve is rotated in one direction relative to said nuts, a plurality of first detent means spaced angularly from one another around one of said second nut and said sleeve, second detent means carried by the other of said second nut and said sleeve, said second detent means normally being axially slidably engaged with certain ones of said first detent means and normally coupling said sleeve and said second nut against relative rotation, and said second detent means releasing said certain ones of first detent means and then engaging different ones of said first detent means when said sleeve is rotated relative to said nuts with torque of sufficient magnitude to overcome the rotational coupling effect of said certain ones of said detent means.

4,872,796

COMPOUND DEVICE FOR PUNCHING AND BINDING

Kun-Chih Hsieh; Jien-Hung Chow, and Hsin-Chien Chen, all of P.O. Box 10780, Taipei 10099, Taiwan

Filed Jun. 17, 1988, Ser. No. 208,162
Int. Cl.[4] B42L *19/12*
U.S. Cl. 412—16 **5 Claims**

1. A compound device for punching and binding includes:

a base having a transverse slot and a transverse scale;

a power member fixed upon the rear portion of the said base;

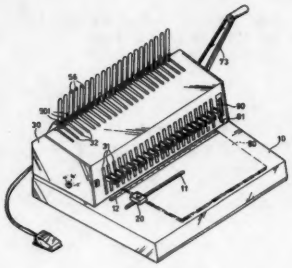
a cover with several vertical slots on its front plate and several horizontal L-shaped slots on its top plane;

a coaxial dual shaft means composed of a main shaft and a manual shaft;

a couple of pinions fixed on the said main shaft;

a couple of racks engaged with the said pinions being fixed on the punch bar;

a comb plate providing comb and guide slots for slide plate to slide along;
a hook plate to open the bindings;
a slide plate driven by the shifting arm to push the said hook plate to and fro;
a swing arm fixed on the said manual shaft has a rod at its swing end;
a couple of shifting arms having an indent on their middles respectively to hold the said rod of swing arm and having



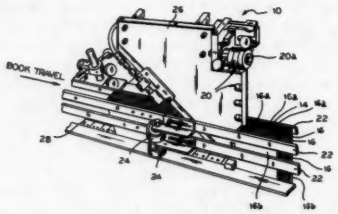
a rod around their upper ends respectively to drive the said slide plate; and
the said coaxial dual shaft means is composed of two individual shafts, which can be either joined together as a connected shaft or divided into two individual shafts—one manual shaft and one mainshaft, which can rotate separately/synchronously by removing/inserting a pin, and therefore, the device can be driven by either electric motor or by manpower while the binding operation is always operated by manpower.

4,872,797

BOOK OPENING APPARATUS

Jorg Schniter, Glenview, Ill., assignor to R.R. Donnelley & Sons Company, Chicago, Ill.

Filed Dec. 1, 1988, Ser. No. 278,498
Int. Cl.[4] B42C *5/00*
U.S. Cl. 412—25 **20 Claims**



1. An apparatus for opening a book at a preselected location in the book, the book having a plurality of pages held in assembled relation with adjacent foredges substantially in contact with one another, the apparatus comprising:
means for delivering the book to an opening station, said delivering means being adapted to move the book from a supply station to the opening station and thereafter away from said opening station;
means at said opening station for holding the pages of the book in assembled relation as the book is moved by said delivering means; and
rotatable means at said opening station for initiating separation of the pages of the book by contacting and entering the book at one end of the adjacent foredges of the pages, said rotatable means causing one of the pages to be separated from the next adjacent page at said preselected location in the book,

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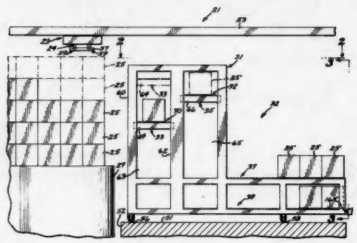
4,872,798

VESSEL TO DOCK CARGO TRANSFER APPARATUS

Allan R. Ide, 4020 Elm St., Apt. A, Long Beach, Calif. 90807

Filed Jun. 5, 1987, Ser. No. 59,263
Int. Cl.[4] B65G *63/00, 67/60*
U.S. Cl. 414—141.3 **7 Claims**

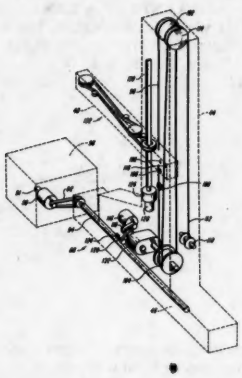


1. Cargo handling apparatus for transferring containers of cargo between a dock and a vessel and comprising:
a transfer frame mounted on said dock and formed with an upstanding open top elevator tower defining an elevator shaft, said tower being formed in its side facing said ship with a vertically elongated topless doorway for passage therethrough of such containers, said frame being further formed adjacent the bottom of said tower with a laterally projecting accumulator frame;
elevator means mounted in said tower and formed with at least one upwardly facing container support means for receiving such containers and operative to be raised between an elevated container transfer level and a lower accumulator level;
accumulator conveyor means mounted on said accumulator frame at said accumulator level for receipt of multiple ones of said containers for accumulation thereof;
an overhead boom mounted on said dock and projecting horizontally over said tower and said vessel to define therebelow a pathway leading from said vessel through said topless doorway and over said container support means;
a trolley mounted on said boom for travel thereon between said tower and said vessel;
hoist means on said trolley, including deployable cable means suspending container grabbing means for grabbing said containers, said hoist means being operable to raise and lower said container grabber means concurrent with travel of said trolley along said pathway to pass through said topless doorway to transfer such containers from various levels on said ship directly onto said upwardly facing support means; and
drive means for driving said trolley along said boom, raising and lowering said hoist and raising and lowering said container support means in said tower and for driving said conveyor means whereby said drive means may be actuated to drive said trolley means along said boom to be positioned over containers loaded on said vessel, said hoist actuated to lower said grabber means onto a container, said grabbing means actuated to grab said container and, said hoist means actuated to raise said container as said trolley is driven along said boom carrying said container along said pathway and through said topless doorway for deposit directly on said container support means which is lowered by said drive means to said accumulator level for transfer to said accumulator conveyor means.

4,872,799
BOAT TRANSFER AND QUEUING FURNACE ELEVATOR AND METHOD

Daniel J. Fisher, Jr., Chelmsford, Mass., assignor to BTU Engineering Corporation, North Billerica, Mass.

Continuation of Ser. No. 734,919, May 16, 1985, abandoned.
This application Jun. 16, 1987, Ser. No. 65,182
Int. Cl.[4] B65G 25/00; F27D 3/00
U.S. Cl. 414—180 5 Claims



1. A high-output, multiple-processing semi-conductor processing system providing transfer and queuing of selected ones of whole furnace loads of boat-loaded wafers all at once to and from any selected one of a plurality of boat-loading mechanisms that are each operatively associated with a corresponding one of plural semiconductor processing furnace tubes of a semiconductor processing furnace in such a way that the several mechanisms and tubes respectively are axially aligned, comprising:

a work station at which a furnace load of semiconductor wafers as a whole are temporarily deposited for subsequent transfer to boat-loading mechanisms for processing in a selected furnace tube, at which a furnace load of already processed semiconductor wafers as a whole are temporarily deposited from said boat-loading mechanisms after processing in a selected furnace tube, and at which each of one or more furnace loads of semiconductor wafers as a whole are temporarily queued while being transferred between several furnace tubes during multiple-processing;

said work station including one or more intermediate transfer shelves upon which said wafers are queued during transfer, a loading shelf upon which said wafers are deposited for transfer to a selected furnace tube, and an unloading shelf upon which said wafers are deposited after processing in selected ones of the furnace tubes;

said work station being stationed at a work station position selected in relation to said boat-loading mechanisms of the several furnace tubes so as to provide unobstructed operative transfer pathways therebetween;

means for transferring as a whole any one of said furnace loads of wafers between any one of said boat-loading mechanisms and any one of said shelves of said work station along said pathways, said transferring means including

a body having a tower upstanding along a Z axis, an arm extending from the tower along an X axis and a frame attached to the arm, said frame having fingers extending along a Y axis for engaging a furnace load of wafers to be moved as a whole between said work station and said boat loading mechanisms, wherein said X axis is parallel to said axial alignment of said boat loading mechanism, said Y axis is horizontally perpendicular to said X axis and said Z axis is mutually orthogonal to said X and Y axis;

means coupled to said body for controllably providing access of said fingers to a plurality of stopping positions along a first range of said X axis, said first range defined at least between the X coordinates of said boat-loading mechanisms and the X coordinate of said position of said work station; said means coupled to said body further for controllably providing access of said fingers to a plurality of stopping positions along a second range of said Y axis, said second range of at least defined between the Y coordinates of said boat-loading mechanisms, the Y coordinates of said work station position, and the Y coordinates of the X axis, said means coupled to said body further for controllably providing access of said fingers to a plurality of stopping positions along a third range of said Z axis, said third range at least defined by the Z coordinates of said boat-loading mechanisms and by the Z coordinates of said shelves of said work station:

said controllably providing access means including an X drive sub-assembly;

said X-drive sub-assembly including an X-drive motor mounted at a Z coordinate below said third range of said Z axis to keep X-drive motor generated pollution below said operative transfer pathways; and

an X-linkage coupled between said X-drive motor and said body for providing access of said fingers to any selected X coordinate of said first range of said X axis;

said controllably providing access means further including:

a Z-drive sub-assembly;

said Z-drive sub-assembly including a Z drive motor mounted at a Z coordinate below said third range of said Z axis to keep Z-drive motor generated pollution below said operative transfer pathways; and

a Z-linkage coupled between said body and said Z-drive motor for providing access of said fingers to any selected Z coordinate of said third range of said Z axis; and

said controllably providing access means further including a Y-drive sub-assembly;

said Y-drive sub-assembly including a Y-drive motor mounted at a Z coordinate below said third range of said Z axis to keep Y-drive motor generated pollution below said operative transfer pathways; and

a Y-linkage coupled between said Y-drive motor and said body for providing access of said fingers to any selected Y-coordinate of said second range of said Y axis, said Y-linkage including a flat bar journaled in said arm and coupled to said Y drive motor, and means for moving said fingers along said Y axis coupled between said flat bar and said frame having fingers.

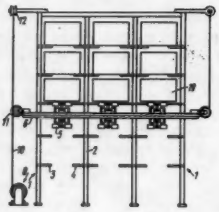
4,872,800
UNIT GOODS STORAGE

Sergei K. Gutov, ulitsa Ramenka, 7 korpus 1, kv. 76; Dmitry A. Plesser, ulitsa Seleznevskaya, 30, korpus 3, kv. 14, and Grigory A. Radutsky, ulitsa Pervomaiskaya, 66, kv. 45, all of Moscow, U.S.S.R.

PCT No. PCT/SU87/00030, § 371 Date Nov. 12, 1987, § 102(e) Date Nov. 12, 1987, PCT Pub. No. WO87/05584, PCT Pub. Date Sep. 24, 1987
PCT Filed Mar. 13, 1987, Ser. No. 156,915
Claims priority, application U.S.S.R., Mar. 14, 1986, 4033006
Int. Cl.[4] B65G 1/04
U.S. Cl. 414—278 1 Claim

1. A unit goods storage comprising: racks; a framework of each of said racks made up of vertical masts; shelves cantilevered at one end to said vertical masts, said shelves having other ends facing each other to form vertical passages; horizontal conveyors having frames and having ends extending beyond said framework and arranged one in each of the passages; a rope and sheave system serving as a drive to cause vertical movement of said conveyors over an entire height of said framework between said other ends of the shelves; stiff tubular

members interconnecting ends of said frames of the conveyors at both ends of each of the conveyors; ropes of said rope and sheave system extending through said stiff tubular members, said stiff tubular members and said frames of the conveyors



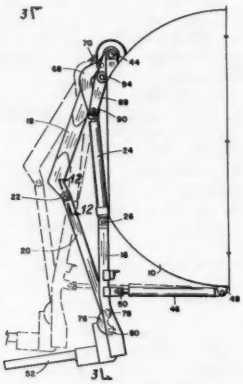
defining a permanent stiff gridwork means for supporting said conveyors and said gridwork means being always located in said passages between said shelves of said racks and moved within said passages by said rope and sheave system.

4,872,801

SIDE REFUSE LOADER FOR VEHICLES

Kenneth L. Yeazel, Tulsa, and Robert J. Forester, Broken Arrow, both of Okla., assignors to Crane Carrier Company, Tulsa, Okla.

Filed Sep. 10, 1987, Ser. No. 95,409
Int. Cl.[4] B65F *3/02*
U.S. Cl. 414—409 **4 Claims**



1. An apparatus for use in lifting a trash can off the ground to above the bin of a refuse collection vehicle so that the trash can is emptied through a hole in the top of said bin which comprises:

two guide rails each with a guide channel having a long straight section and a curved section at the top end;

an upper torsion bar rotatably supported from said bin at a fixed location with respect thereto near the top of said guide rails;

means rotatably attaching the top ends of said guide rails to said upper torsion bar in a non-sliding relationship;

push means pivotally connected to a lower end of the guide rails and said bin to rotate the guide rails about the upper torsion bar;

grabber means for grabbing said trash can;

a pair of lift arms, each said arm having an upper arm segment and a lower arm segment;

means rigidly attaching the upper end of said upper arm segments to said upper torsion bar;

means pivotally connecting the lower end of said lower arm segments to said grabber means including roller means to guide the grabber means along said guide channel;

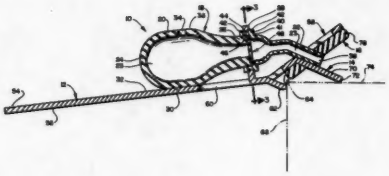
means to rotate said upper torsion bar.

4,872,802

APPARATUS AND METHOD FOR REMOVING THE CONTENTS OF A CAN

Ross E. Abbe, 2721 Victor St., Bellingham, Wash. 98225

Filed Jun. 29, 1987, Ser. No. 67,931
Int. Cl.[4] B65B *69/00*
U.S. Cl. 414—417 **12 Claims**



1. An apparatus to remove contents from a container having a first open portion, a peripheral wall portion and an end wall portion at least partially enclosing the contents, the apparatus comprising:

(a) a handle having a rear end and a front operating end, the handle being arranged to be grasped and rotated manually, said handle having a locating member adapted to engage the can at a pivot location adjacent to said end wall portion;

(b) an opening means located at the front end of the handle spaced from said locating member and arranged to be located adjacent to the end wall portion in a first operating position preparatory to forming an opening in the wall portion, and further arranged to be moved by rotation of the handle along a handle operating path to a second operating position where the opening is formed in the end wall portion;

(c) an opening air sealing means mounted at the front end of the handle and arranged to be moved into sealing engagement with the end wall portion at a sealing position by rotation of the handle along the handle operating path to enclose the opening; and

(d) a manually operable air pressurizing means mounted on said apparatus to inject air through the air sealing means and through the opening formed in the end wall portion to pressurize the interior area of the can.

4,872,803

FORCE CONTROLLING SYSTEM

Kazuo Asakawa, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 675,867, Nov. 28, 1984, abandoned. This application Mar. 29, 1988, Ser. No. 175,616
Claims priority, application Japan, Nov. 30, 1983, 58-226301; Nov. 30, 1983, 58-226302
Int. Cl.[4] B25J *15/08*
U.S. Cl. 414—730 **92 Claims**

1. A force generating apparatus for applying a force to an object by receiving a force information signal, comprising:

a base member;

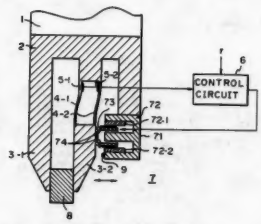
an elastic member fixed to said base member and producing a reactive force when it is displaced;

a movable member, fixed to said elastic member, for applying said force corresponding to said force information signal to said object;

detecting means, provided on said elastic member, for detecting the displacement thereof, so that said detecting means generates a displacement signal corresponding to the displacement;

driving means for driving said movable member, comprising a linear motor having a stator side fixed to said base member and a movable side fixed to said movable member; and

control means, connected to said detecting means and to said driving means for controlling said driving means by said force information signal to move said movable member along a displacement direction, thereby applying a force to said object, and for controlling said driving means by said displacement signal to move said movable member along said displacement direction, thereby counteracting said reactive force of said elastic member, wherein said reactive force is counteracted and said movable member applies only a force corresponding to said force information signal to said object.

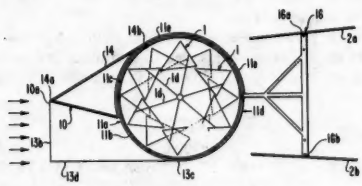


4,872,804

WIND TURBINE HAVING COMBINATION WIND DEFLECTING AND FRAME ORIENTING MEANS AS WELL AS DUAL RUDDERS

Antonio Teles De Menezes, Junior, Fremunde, Quita da Vista Alegre, Portugal

Continuation-in-part of Ser. No. 905,329, Sep. 9, 1986, abandoned. This application Aug. 26, 1987, Ser. No. 89,561
Claims priority, application Portugal, Sep. 17, 1983, 81146
Int. Cl.[4] F03D 1/04
U.S. Cl. 415—2.1 **19 Claims**



1. A device for generating power from wind comprising:

a shaft having a central axis extending vertically in an axial direction;

propelling elements mounted on said shaft; a frame mounted for rotation about said shaft, said frame supporting said shaft for rotation about said central axis due to a force of the wind acting on said propelling elements;

wind deflecting means associated with said frame in combination with rudder means for orienting said frame to have a portion thereof facing the direction of travel of the wind and the wind deflecting means deflecting wind into said propelling elements, said portion of said frame comprising an open first part and a closed second part of said frame, said wind deflecting means deflecting the wind to strike said propelling elements at a position radially outwardly of said central axis of said shaft and radially inwardly of said first part of said frame and said wind deflecting means preventing the wind from striking said propelling elements at a position radially inwardly of said second part of said frame, said wind deflecting means having a pair of sidewalls forming a vertically extending edge which faces into the wind and which lies in a plane which contains said central axis of said shaft and which is parallel to the wind direction;

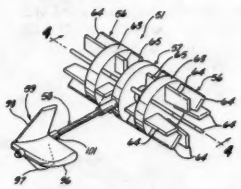
said rudder means being disposed on a side of said frame opposite to said portion thereof facing the wind, said rudder means being reflected by the wind for providing forces which counteract wind faces acting on said pair of sidewalls for orienting of said portion of said frame in an angular position facing the direction of the wind, said rudder means comprising a pair of spaced-apart rudders separated from each other in a direction perpendicular to said central axis, each of said rudders being pivotable about a rudder axis parallel to said central axis and being fixable in any one of a plurality of desired angular positions with respect to said rudder axis.

4,872,805

WATER POWERED DEVICE

Kotaro Horiuchi, Hamamatsu, and Masato Suzuki, Iwata, both of Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

Division of Ser. No. 792,970, Oct. 30, 1985, Pat. No. 4,737,070. This application Nov. 2, 1987, Ser. No. 115,339
Claims priority, application Japan, Jul. 31, 1985, 60-167638; Jul. 31, 1985, 60-167639
Int. Cl.[4] F03B 7/00
U.S. Cl. 415—7 **20 Claims**



1. A water powered device adapted to be positioned in a stream of water to be powered by the water movement, said device comprising first, second and third axially spaced components, at least one of said components comprising a water wheel having a plurality of vanes and being rotatable about an axis, and at least another of said components comprising a water driven device comprising an outer housing, a driven element contained within said outer housing and having an input shaft driven by said water wheel for driving said driven element, at least two of said components having a cylindrical outer peripheral surface of greater diameter than the remainder of said two components and the remaining component for rolling of said device along the ground on said two component outer peripheral surfaces.

4,872,806

CENTRIFUGAL PUMP OF VORTEX-FLOW TYPE

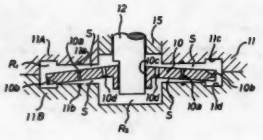
Yutaka Yamada, 42, 2-chome, Komenoza-cho, Tsushima-shi, Aichi-ken; Tadashi Kozawa; Naohiro Natsume, and Hirofumi Komatsubara, all of Oobu, Japan, assignors to Aisan Kogyo Kabushiki Kaisha, Oobu and Yutaka Yamada, Aichi, both of, Japan

Filed May 16, 1988, Ser. No. 194,517

Claims priority, application Japan, May 15, 1987, 62-119887; Jul. 31, 1987, 62-192813; Sep. 8, 1987, 62-224983

Int. Cl.[4] F04D *5/00*

U.S. Cl. 415—55.5 5 Claims



1. A centrifugal pump of the vortex-flow type comprising a pump housing defining therein an arcuate pump chamber in surrounding relationship with a central sealed chamber, and a disc-like impeller rotatably and axially movably assembled within said pump housing and having opposite end faces each forming a close clearance with a corresponding internal end wall of the pump housing between the sealed and pump chambers, said impeller having on either end face of the rim portion thereof a plurality of circumferentially spaced vane grooves which cooperate with the pump chamber to produce a discharge pressure therein and being formed with at least one pressure balancing hole extending axially therethrough in the interior of the sealed chamber,

wherein the opposite end faces of said impeller are each formed at an intermediate annular portion thereof with a plurality of circumferentially spaced arcuate recesses which are arranged in surrounding relationship with the sealed chamber and tapered toward an axial hole formed in said impeller at each center of said arcuate recesses.

4,872,807

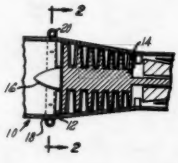
STATIC PRESSURE SYSTEM FOR GAS TURBINE ENGINES

Frank B. Thompson, North Palm Beach, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 5, 1988, Ser. No. 279,633

Int. Cl.[4] F01D *17/08*

U.S. Cl. 415—118 3 Claims



1. For a gas turbine engine having a casing defining an inlet for leading air to said engine, a plane transverse to said inlet defining the upstream end of said engine, means for measuring the static pressure for obtaining a value of the total pressure of the airstream in said inlet that exhibits a value within a tolerance that is acceptable to be used in an engine control, said means including a plurality of ports circumferentially spaced in said casing located in proximity to said face for leading static pressure into a common manifold, and means for measuring the pneumatic pressure in said manifold for obtaining an average value of the static pressure of the air being admitted into said engine.

4,872,808

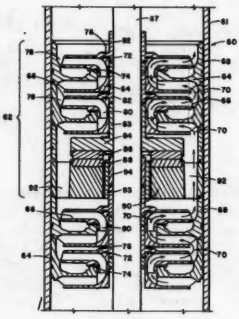
CENTRIFUGAL PUMP MODULAR BEARING SUPPORT FOR PUMPING FLUIDS CONTAINING ABRASIVE PARTICLES

Brown L. Wilson, Tulsa, Okla., assignor to Oil Dynamics, Inc., Tulsa, Okla.

Filed Jun. 22, 1987, Ser. No. 64,685

Int. Cl.[4] F04D *29/02*

U.S. Cl. 415—170.1 16 Claims



1. A submersible pump for pumping fluids which may contain abrasives which comprises:

a plurality of vertically oriented diffusers which form an outer casing,

a longitudinal shaft rotatably mounted through the center of said diffusers;

an impeller for each said diffuser, each impeller having a hub supported by said shaft and axially moveable thereon, the bottom of each hub of each impeller capable of abuttment with the top of the next lower impeller hub to transfer down thrust to said next impeller hub,

a thrust bearing assembly positioned about said shaft, said assembly having a thrust plate rotatably supported to said shaft for receiving said down thrust from the bottommost of said hubs; and

a stationary thrust bearing in contact with said thrust plate, said thrust bearing supported to said outer casing of said diffuser whereby said down thrust is transferred to said outer casing.

4,872,809

SLURRY PUMP HAVING INCREASED EFFICIENCY AND WEAR CHARACTERISTICS

Graeme R. Addie, and Robert J. Visintainer, both of Augusta, Ga., assignors to GIW Industries, Inc., Grovetown, Ga.

Filed Mar. 6, 1987, Ser. No. 22,787

Int. Cl.[4] F04D *29/44*

U.S. Cl. 415—206 3 Claims

1. A centrifugal pump for pumping a slurry, comprising:

(a) a shell defining a pump housing, said shell having a longitudinal axis and a radius and further including:

(1) a throat having an actual throat area;

(2) a tongue positioned along a peripheral portion of said shell; and

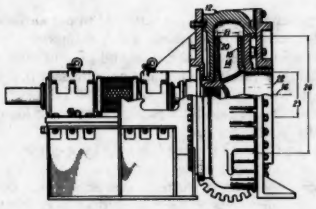
(3) an outlet branch; and

(b) an impeller rotatably disposed within said housing for rotation about said axis, said impeller including:

(1) an outlet area;

(2) a plurality of vanes;

(3) an inside and outside shroud secured to said vanes and defining a shroud width;
(4) an outside diameter; and
(5) an eye having a diameter;
wherein the ratio of the impeller outlet area to the shell actual throat area is from about 5.0 to about 9.0, wherein the ratio of the radius of the shell at said tongue to the radius of the shell



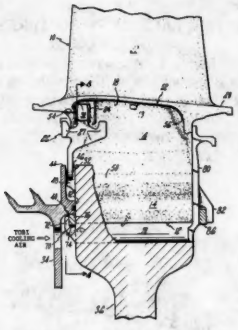
at right angles to a branch centerline is from about 0.8 to about 0.9, wherein the ratio of said impeller outside diameter to said shroud width is from about 5.0 to about 78.0, wherein the ratio of said impeller outside diameter to said impeller eye diameter is from about 1.5 to about 3.5, and wherein the ratio of said impeller outside diameter to said shell radius at said tongue is from about 1.5 to about 1.8.

4,872,810

TURBINE ROTOR RETENTION SYSTEM

Wesley D. Brown, Jupiter; Edward C. Hill, Tequesta, and Peter T. Vercellone, Lake Worth, all of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 14, 1988, Ser. No. 284,269
Int. Cl.[4] F01D *5/26*
U.S. Cl. 416—145 **10 Claims**



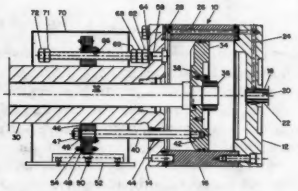
6. In combination, a damper and interplatform seal for a gas turbine engine having a turbine comprising a disk and a plurality of blades extending radially from and being circumferentially supported in the rim of the disk, means for absorbing excessive vibratory motions occasioned by the rotation of the turbine, said means including a damper formed from a weighted element having an inner diameter and outer diameter in its assembled position and opposing side walls, opposing pockets formed in the neck of each of said blades being dimensioned to accept the side walls of said element at its outer diameter, a TOBI rotor seal adjacent said disk and extending radially adjacent the necks of said blades and defining a cavity, the inner diameter of said element being trapped in said cavity, a lug on said blade extending axially toward said TOBI rotor seal and overlying a portion of said inner diameter of said element, whereby said element is trapped in the assembled position and movable between adjacent blades to absorb the energy induced by vibratory motion experienced by said turbine and each of said blades having a platform extending over the rim surface of said disk, said interplatform seal comprising a relatively flat rectangular plate member curved at either end fitting underneath adjacent platforms to seal the lateral extending gap between adjacent platforms, nubs formed on the forward and rearward underside surface of said platform for receiving and retaining said plate member, and a shelf defined by the top wall of said pockets defining a gap for permitting said plate member from sliding over the top surface of said damper.

4,872,811

INBOARD SERVO FOR MARINE CONTROLLABLE PITCH PROPELLERS

Joseph L. Cavallaro, Canton, and Patrick J. Kelly, Jr., Shrewsbury, both of Mass., assignors to Bird-Johnson Company, Walpole, Mass.

Filed Aug. 3, 1987, Ser. No. 80,785
Int. Cl.[4] B63H *3/08*
U.S. Cl. 416—162 **4 Claims**



1. In an inboard servo for controlling the pitch of a marine controllable pitch propeller of the type in which the pitch is controlled by a force rod received in and movable axially of a propeller drive shaft, the servo having a hydraulic cylinder adapted to be affixed to the shaft coaxially with and for rotation with the shaft, a piston in the cylinder coupled to the force rod, means for supplying hydraulic fluid under pressure selectively to the cylinder on either side of the piston to move the piston and force rod forward or aftward for propeller pitch control, a feedback device for detecting the position of the force rod as an indication of the actual pitch of the propeller, and an emergency lock device for preventing movement of the force rod relative to the shaft the improvement wherein the feedback device includes a feedback ring located externally of and proximate to an end wall of the cylinder and concentric with the cylinder axis and at least two connecting rods located symmetrically with respect to the axis of the force rod and coupling the feedback ring to the piston for conjoint movement therewith, the connecting rods passing through openings in said end wall of the cylinder in sealed relation, and, wherein the emergency lock device includes at least two threaded looking rods affixed to the cylinder and received freely through holes in the feedback ring in symmetrical relation with respect to the axis of the force rod such that the feedback ring can move freely relative to the threaded rods, over the entire working stroke of the piston, and at least one locking nut received by each locking rod, each locking nut normally being positioned on the respective threaded rod in a location where it is not engageable by the feedback ring at any point during the working stroke of the piston in controlling propeller pitch but being adapted to be threaded along the respective locking rod and into engagement with the feedback ring at a selected point along the working stroke of the piston to establish and hold a selected propeller pitch by preventing movement of the feedback ring relative to said end wall and consequently preventing the piston from moving relative to the feedback ring

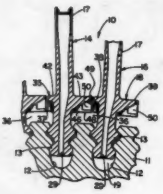
because of the fixed connection between the feedback ring and the piston afforded by the connecting rods.

4,872,812

TURBINE BLADE PLATEFORM SEALING AND VIBRATION DAMPING APPARATUS

David G. Hendley, Wyoming, and William A. Litzinger, Cincinnati, both of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Aug. 5, 1987, Ser. No. 81,773
Int. Cl.[4] F01D 5/22
U.S. Cl. 416—190 **18 Claims**



1. An insert element to be loosely received between first and second opposing and converging edge surfaces of adjacent blade platforms of a rotor of a gas turbine engine and, in response to centrifugal forces acting thereon due to high rotor rotation speed, to seal a gap between the edge surfaces and to dampen vibration of the blades, said element comprising:

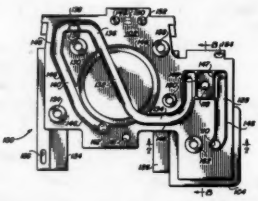
an elongated body having a longitudinal axis and at least three element surfaces configured and arranged symmetrically about said longitudinal axis so that, irrespective of the orientation with which said element is received between the platform edges, the centrifugal forces will drive one of said element surfaces into sealing engagement against the first edge surface and will drive another of said element surfaces into sealing engagement against the second edge surface.

4,872,813

DISPOSABLE CASSETTE FOR A MEDICATION INFUSION SYSTEM

Lanny A. Gorton, Sunland, and John P. Pelmulder, Chatsworth, both of Calif., assignors to Pacesetter Infusion, Ltd., Sylmar, Calif.

Filed Dec. 1, 1987, Ser. No. 127,333
Int. Cl.[4] E04B 21/00, 39/14
U.S. Cl. 417—63 **19 Claims**



1. A disposable cassette for use with a medication infusion system, comprising:

a cassette body having an upper surface, said cassette body including a cylinder disposed below the upper surface of said cassette, one end of said cylinder being sealingly attached to the bottom of said upper surface, the other end of said cylinder being open, said upper surface of said cassette body having disposed therein first, second, and third apertures extending therethrough, said second aperture being in communication with the interior of said cylinder at said on end thereof;

piston means located in said cylinder for varying the fluid volume contained in said cylinder by alternately drawing fluid into said cylinder through said second aperture and forcing fluid out of said cylinder through said second aperture;

an inlet passageway recessed into said upper surface of said cassette body, said inlet passageway being open on the top side of said upper surface, one end of said inlet passageway being in fluid communication with said first aperture through which fluid is supplied to sad inlet passageway, the other end of said inlet passageway being located near to said second aperture;

an outlet passageway recessed into said upper surface of said cassette body, said outlet passageway being open on the top side of said upper surface, one end of said outlet passageway being located near to said second aperture, the other end of said outlet passageway being in fluid communication with said third aperture through which fluid is removed from said outlet passageway;

diaphragm means for sealing the open top sides of said inlet and outlet passageways; and

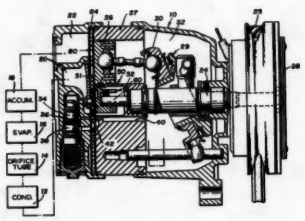
flexible, resilient domed valve means for forming a cavity over a portion of said upper surface of said cassette body including said other end of said inlet passageway, said second aperture, and said one end of said outlet passageway, said cavity being in fluid communication with said inlet passageway, said second aperture leading to said cylinder, and said outlet passageway, said valve means being selectively deformable to prevent the flow of fluids between said inlet passageway and said second aperture, said valve means also being selectively deformable to prevent the flow of fluids between said second aperture and said outlet passageway.

4,872,814

VARIABLE DISPLACEMENT COMPRESSOR PASSIVE DESTROKER

Timothy J. Skinner, E. Amherst; Joseph L. Spurney, Tonawanda, and Weiming Ma, Williamsville, all of N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 9, 1988, Ser. No. 204,338
Int. Cl.[4] F04B 1/26
U.S. Cl. 417—222 **2 Claims**



1. A variable stroke axial piston wobble plate compressor comprising a suction cavity, a discharge cavity, a sealed crankcase, a drive shaft extending through said crankcase, a tiltable wobble plate mechanism in said crankcase mounted on and driven by said drive shaft, stroke increase control valve means for connecting said discharge cavity to said crankcase thereby to affect pressure increase therein tending to tilt said wobble plate mechanism toward a zero piston stroke position, stroke decrease control valve means for connecting said suction cavity to said crankcase thereby to affect a pressure decrease therein tending to tilt said wobble plate mechanism toward a

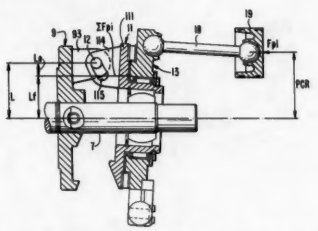
maximum piston stroke position, said compressor being characterized by a valve member having a counterweight portion and a flat valve face, said valve member receiving an end portion of said shaft with substantial radial clearance therebetween, drive means operatively drivingly connecting said valve member to said end portion for rotation therewith and guiding radial movement of said valve member relative to said shaft, a spring arranged so as to normally urge contact of said end portion and valve member thereby to normally establish said valve member in a closed valve position and yieldable in response to centrifugal force generated by said counterweight portion at a predetermined shaft speed to permit centrifugally forced movement of said valve member to an open valve position, a compressor part having a flat surface facing said valve face, a regulating passage permanently open to said discharge cavity and extending through said flat surface at a port in central axial alignment with said shaft, a delivery passage permanently open to said crankcase and extending through said flat surface at a port radially outward of said regulating passage port, a spring arranged between said shaft end portion and said valve member continuously forcing sealing contact of said valve face with said flat surface of said compressor part, said valve face having channel means therein positioned to be closed to said regulating passage port by contact of said valve face with said flat surface in said closed valve position and to be continuously open thereto during rotation of said valve member with said shaft when said valve member is in said open valve position, said channel means further positioned to be closed to said delivery passage port by contact of said valve face with said flat surface in said closed valve position and to be continuously open thereto during rotation of said valve member with said shaft when said valve member is in said open valve position whereby said channel means effects communication between said discharge cavity and said crankcase only when said valve member is urged by centrifugal force to said open valve position at said predetermined shaft speed.

4,872,815

SLANT PLATE TYPE COMPRESSOR WITH VARIABLE DISPLACEMENT MECHANISM

Kazuhiko Takai, Maebashi, Japan, assignor to Sanden Corporation, Gunma, Japan

Filed Feb. 19, 1988, Ser. No. 157,783
Claims priority, application Japan, Feb. 19, 1987, 62-36445
Int. Cl.[4] F04B *1/26, 27/08*
U.S. Cl. 417—222 **8 Claims**



1. In a wobble plate type compressor with a variable displacement mechanism, the compressor comprising a compressor housing having a cylinder block provided with a plurality of cylinders which in turn are associated with a suction chamber, said compressor also having a crank chamber adjacent the cylinder block, a drive shaft rotatably supported in the housing, a cam rotor fixed on the drive shaft and further connected to an inclined plate wherein the connection comprises a hinge means for providing variable inclination of the inclined plate with respect to the drive shaft, a wobble plate adjacent the inclined plate, rotational motion of the inclined plate being converted into nutating motion of the wobble plate, and a plurality of pistons coupled with the wobble plate each of which is reciprocably fitted within a respective one of the cylinders and of which the stroke volume is changed in accordance with variation of the angle of the inclined plate, the improvement comprising:

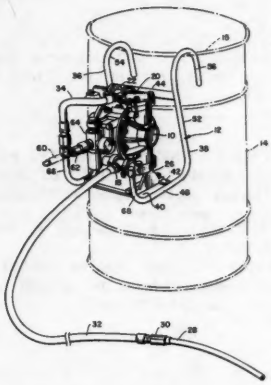
said hinge means comprising return means for permitting the inclined plate to rapidly return to its maximum angular orientation, which maximizes said stroke volume, solely in response to the difference between crank chamber pressure and suction chamber pressure, said return means including a first arm portion extending from the cam rotor, said first arm portion having a guide pin fixedly secured thereto, wherein the distance between the center of said guide pin and the central axis of said drive shaft is selected from within the range and inclusive of 78–90 percent of the distance between the central axis of at least one of said cylinders and the central axis of said drive shaft and the distance between the guide pin and the central axis of the shaft substantially remaining constant during variation of the angle of the inclined plate.

4,872,816

EVACUATION PUMP ASSEMBLY

Michael Fetcko, Habron, Ind., assignor to The Aro Corporation, Bryan, Ohio

Filed Oct. 28, 1988, Ser. No. 263,688
Int. Cl.[4] F04B *55/00*
U.S. Cl. 417—360 **4 Claims**



1. An improved portable pump assembly for evacuation of fluid from a reservoir for discharge into a container, said assembly comprising, in combination:

a pump having an inlet manifold with an inlet and a outlet manifold with an outlet; and

a bracket for supporting the assembly on a container, said bracket including;

a support platform for the pump; and

a first hollow tube attached to the platform, said tube defining at one end thereof a support hook for supporting the platform on the container and including a fluid inlet connector at the opposite end, said outlet of the pump being attached to the inlet connector to thereby direct pumped fluid through the tube for discharge from the support hook end into the container, the inlet to the inlet manifold being attached to a fluid inlet conduit.

4,872,817

INTEGRAL DEFLECTION WASHER COMPRESSOR WHEEL

Jack De Kruif, Carson, Calif., assignor to Allied-Signal Inc., Morristown, N.J.

Filed Jul. 19, 1984, Ser. No. 632,761
Int. Cl.[4] F04B *17/00*
U.S. Cl. 417—407 **3 Claims**

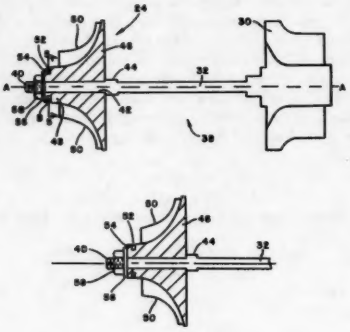
1. A rotor-shaft assembly comprising:

a shaft having a mounting face thereon defined by a shoulder;

a rotor having two mounting faces and a nose portion;

means, having a mounting face, for securing said rotor to said shaft adjacent said shoulder in a rotatble relationship; and

means, integral with said rotor, for preventing the rotation of imbalance of said rotor-shaft assembly during attachment of said rotor to said shaft, said means comprises an annular slot extending radially inward from the outer surface of said nose portion.



4,872,818

ROTARY PUMP HAVING ALTERNATING PISTONS CONTROLLED BY NON-CIRCULAR GEARS

Akira Takami, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

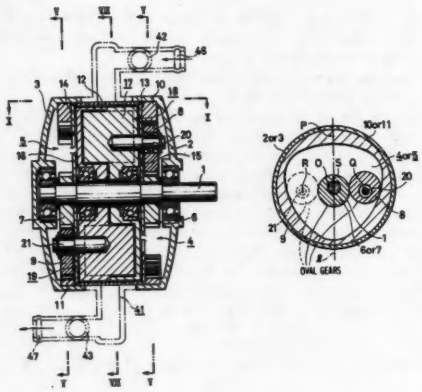
PCT No. PCT/JP87/00537, § 371 Date Mar. 21, 1988, § 102(e) Date Mar. 21, 1988

PCT Filed Jul. 23, 1987, Ser. No. 184,553

Claims priority, application Japan, Jul. 26, 1986, 61-176288

Int. Cl.[4] F04C 2/077

U.S. Cl. 418—36 1 Claim



1. A rotary pump apparatus, comprising:

(a) means (12-16) defining a cylindrical chamber (17),

(b) suction port means and discharge port means individually defined by the chamber,

(c) a pair of generally cylindrical rotary pistons (18, 19) disposed within the chamber, each piston defining a plurality of sector shaped, axially directed projections (32) individually separated by an equal plurality of sector shaped recesses (31) spanning greater arcs than the projections, said pistons being disposed facing each other such that the projections of each are accommodated within the recesses of the other,

(d) a drive shaft (1) extending centrally and axially through the chamber and pistons,

(e) bearing means rotatably supporting the pistons on said drive shaft,

(f) a pair of sun and planet gear systems (4, 5) disposed axially flanking the chamber and pistons and individually associated with said pistons, each system comprising:

(1) a non-circular sun gear (6, 7) eccentrically mounted to the shaft for rotation therewith,

(2) a non-circular planet gear (8, 9) eccentrically mounted to an associated piston and disposed in engagement with an association sun gear, and

(3) a stationary ring gear (10, 11) surrounding and engaging an associated planet gear, and having a non-circular inner configuration,

(g) wherein the planet gears undergo orbital rotation which impart cyclical speed, continuous rotation to the respective pistons, which in turn continuously expands and contracts sector shaped spaces between adjacent projections of the pistons to implement pumping.

4,872,819

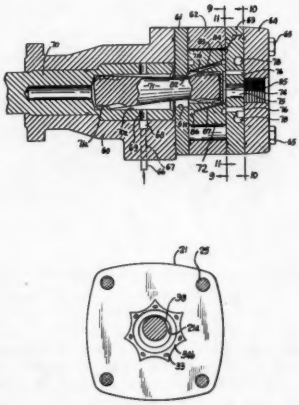
ROTARY GEROTOR HYDRAULIC DEVICE WITH FLUID CONTROL PASSAGEWAYS THROUGH THE ROTOR

Hollis N. White, Jr., 243 Pyle La., Hopkinsville, Ky. 42240

Division of Ser. No. 840,993, Mar. 14, 1986, Pat. No. 4,697,997, which is a continuation-in-part of Ser. No. 360,832, Mar. 23, 1982, Pat. No. 4,474,544, which is a continuation-in-part of Ser. No. 113,400, Jan. 18, 1980, Pat. No. 4,357,133, which is a continuation of Ser. No. 910,075, May 26, 1978, abandoned. This application Mar. 2, 1987, Ser. No. 942,836

Int. Cl.[4] F03C 2/08; F04C 2/10

U.S. Cl. 418—61.3 22 Claims



1. In a gerotor hydraulic pressure device having a housing, a rotor with a certain eccentric rotary motion , full revolution constant commutation between a fluid passage in the housing and a single ring shaped fluid passage in the rotor, and a valv-

ing manifold on one side of the rotor selectively connecting valving passages in the rotor to the expanding and contracting gerotor cells of the device, the improvement of one of the fluid passage in the housing or the fluid passage in the rotor being laid out in a pattern substantially following the certain eccentric rotary motion of the rotor, said pattern facilitating the fluid commutation between the passages.

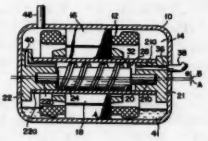
9. In a gerotor hydraulic pressure device having a housing, a rotor with two flat axial end surfaces rotatively engaging the housing at planes, gerotor cells and two fluid connections, a improved fluid control comprising a pair of travel passageways, 100% of the fluid traveling through said pair of travel passageways, said pair of travel passageways being in the rotor, means at one plane to connect one of said pair of travel passageways to one of the two fluid connections, means at the other plane to connect the other of said pair of travel passageways to the other of the two fluid connections and valving means within the housing at said one plane to connect said pair of travel passageways to the gerotor cells selectively as the device is operated such that the commutation of one of said pair of travel passageways occurs on the opposite side of the rotor from the commutation of the other of said pair of travel passageways and the valving means to connect said pair of travel passageways to the gerotor cells.

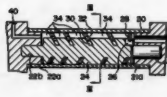
4,872,820

AXIAL FLOW FLUID COMPRESSOR WITH ANGLED BLADE

Toshikatsu Iida, Yokohama; Takayoshi Fujiwara, Kawasaki, and Yoshinori Sone, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 7, 1988, Ser. No. 280,880
Claims priority, application Japan, Jan. 5, 1988, 63-493
Int. Cl.[4] F04B *39/00*
U.S. Cl. 418—220 **12 Claims**





1. A compressor comprising:

a cylinder having a suction-side end and a discharge-side end;

a columnar rotary member arranged in the cylinder to extend in the axial direction thereof and be eccentric thereto, and rotatable relative to the cylinder while part of the rotary member is in contact with the inner peripheral surface of the cylinder, said rotary member having a spiral groove on the outer periphery thereof, said groove having pitches narrowed gradually with distance from the suction-side end of the cylinder, and said groove being formed such that a depth direction thereof extending from the bottom of the groove to an opening thereof is inclined at a predetermined angle toward the discharge-side end of the cylinder with respect to a direction perpendicular to the axis of the rotary member;

a spiral blade fitted in the spiral groove to be slidable in the depth direction, having an outer peripheral surface intimately in contact with the inner peripheral surface of the cylinder, and dividing a space between the inner peripheral surface of the cylinder and the outer periphery of the rotary member into a plurality of working chambers; and

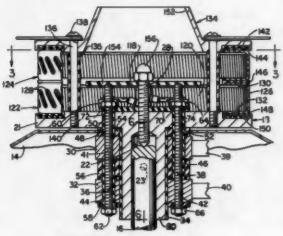
driving means for relatively rotating the cylinder and the rotary member, thereby introducing a fluid from the suction-side end of the cylinder into the cylinder, and transporting this fluid toward the discharge-side end of the cylinder through the plurality of working chambers.

4,872,821

COTTON CANDY MACHINE

Ronald R. Weiss, Colerain Township, Hamilton County, Ohio, assignor to Gold Medal Products Co., Cincinnati, Ohio

Filed Mar. 23, 1987, Ser. No. 29,278
Int. Cl.[4] A23G *3/00*; B28B *17/00*
U.S. Cl. 425—9 **3 Claims**



1. A spinner assembly for a cotton candy machine which comprises a tubular wall member having an upright wall provided with a plurality of slots, a tubular heater element supported by the wall members in close proximity with the slots, the wall member being of aluminum material, and a dielectric anodized coating on the wall member to insulate the wall member from the heater element.

4,872,822

TIRE CURING PRESS MECHANISM

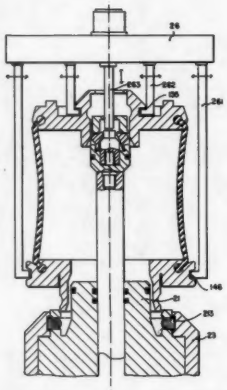
Augusto Pizzorno, Milan, Italy, assignor to Pirelli Coordinamento Pneumatici S.p.A., Milan, Italy

Filed Nov. 24, 1987, Ser. No. 124,980
Claims priority, application Italy, Dec. 1, 1986, 22514 A/86
Int. Cl.[4] B29D *30/06*
U.S. Cl. 425—48 **21 Claims**

1. A bladder assembly comprising a substantially cylindrical, flexible and elastically deformable sleeve (**10**) provided with first and second beads on first and second ends of said sleeve, a movable clamp (**13**) to block said first end of said sleeve and a fixed clamp (**14**) to block said second end of said sleeve, said movable clamp comprising a disc (**131**) provided with a coaxial hub (**132**) and a first fastening ring (**133**) secured to said disc, said disc and said first fastening ring each having a peripheral portion which can be associated with said first bead of said sleeve, and connecting means to block said first bead on said movable clamp between said disc and said first fastening ring, said fixed clamp comprising a tube portion (**141**) having a flanged end and a pair of distinct coaxial elements including a second fastening ring (**142**) integrally associated with a flange edge (**143**), each element having an annular portion of its surface which can be associated with said second bead of said sleeve, and connecting means to block said second bead on said fixed clamp, and means for the automatic engagement and disengagement of said movable and fixed clamps with respect to a corresponding support and operating mechanism, said means comprising at least one coaxial annular groove provided on said coaxial hub of said movable clamp and at least one coaxial annular groove provided on said tube body.

8. An operating mechanism which provides for fast, easy and automatic changing of a bladder assembly on a curing

press comprising an annular support body (21) with a support axis associated with said curing press, a stem (22) coaxial with said annular support body, axially slidable therein, an annular ring nut coaxially rotatable around said annular support body, means to axially displace said stem with respect to said annular support body, and means for the automatic engagement and disengagement of said operating mechanism with said bladder assembly, said engaging and disengaging means comprising a head integrally associated with a free end of said stem, said head comprising at least one peg housed in a corresponding hole provided in said head, which can be radially moved with respect to an axis of said stem, between an expanded position in which said at least one peg protrudes from a radial surface of



a lateral wall of said head and a collapsed position in which said at least one peg is completely contained within said lateral wall of said head, and a coaxial cam means to move said at least one peg from said collapsed position to said expanded position, and at least one peg housed in a corresponding hole provided in said support body which is radially displaceable with respect to an axis of said support body, between a work position in which said at least one peg protrudes from said corresponding hole housing said respective peg and a rest position in which said at least one peg does not protrude from said corresponding hole housing said respective peg, said annular ring nut being provided to move said at least one peg from said rest position to said work position.

4,872,823

APPARATUS FOR FORMING A COLUMNAR REINFORCEMENT IN A CONCRETE WALL PANEL

Albert Howard, San Jose, Calif., assignor to Clay Shanrock, Hollister, Calif., a part interest

Filed Mar. 23, 1984, Ser. No. 593,028

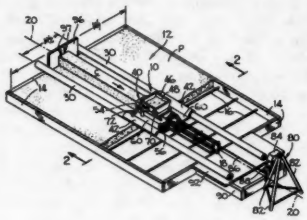
Int. Cl.[4] E04G *11/20*

U.S. Cl. 425—64 **3 Claims**

1. A concrete forming apparatus for forming a columnar reinforcement in a concrete wall panel comprising:

concrete shaping means with a cavity for receiving concrete and with walls adjacent the cavity for shaping the concrete to form a columnar reinforcement along a concrete wall panel, said concrete shaping means including spaced flanges projecting laterally outward within a common plane for engaging concrete in the forming of a columnar reinforcement;

support means supporting said concrete shaping means for movement above a casting space in which a concrete wall panel is formed, said support means having a narrower width than that of the casting space, said support means including a plurality of rails disposed above the casting space, said rails extending along the casting space within the width of the casting space on opposite sides of the location in which a columnar reinforcement is to be formed, said support means further including a runner on each side of said concrete shaping means advancing along one of said rails, said runners being affixed to said flanges, respectively, whereby said concrete shaping means is supported above the casting space by said rails and guided



along a path along the casting space by said rails and guided along a width of the casting space to form the columnar reinforcement within the width of the casting space of the concrete wall panel; and

means for advancing said concrete shaping means along the casting space for forming a columnar reinforcement along a concrete wall panel.

4,872,824

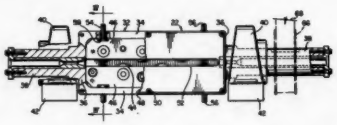
APPARATUS FOR PRODUCING GROOVED SUPPORT MEMBER FOR OPTIC FIBERS

Robert J. Williams, and Randall J. Smith, both of Saskatoon, Canada, assignors to Northern Telecom Limited, Montreal, Canada

Division of Ser. No. 26,230, Mar. 16, 1987, abandoned. This application Mar. 11, 1988, Ser. No. 167,227

Int. Cl.[4] B29C *47/02*; G02B *6/44*

U.S. Cl. 425—113 **5 Claims**

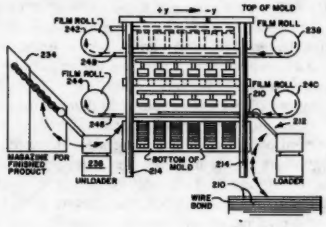


1. Apparatus for making a grooved support member for carrying optical fibers comprising an extrusion die defining a die aperture having circumferentially spaced and fixed projections defining grooves in plastics material to be extruded therethrough, the extrusion die disposed upon a passline for passage of a strength member for the grooved support member through the extrusion die and die aperture to extrude a plastic sheath onto the strength member, a twisting means located upstream from the die along the passline for gripping the strength member as said member is fed through the twisting means and along the passline, the twisting means comprising a plurality of gripping wheels rotatably mounted on opposite sides of the passline with their peripheral surfaces facing towards the passline, the wheels on each side of the passline spaced apart along the passline with the wheels staggered in position along the passline from one side of the passline to the other and a means for rotating the gripping wheels alternately in one direction and then in the other direction around the passline.

4,872,825
METHOD AND APPARATUS FOR MAKING ENCAPSULATED ELECTRONIC CIRCUIT DEVICES

Milton I. Ross, 400 College Ave., Haverford, Pa. 19041

Continuation-in-part of Ser. No. 613,172, May 23, 1984, Pat. No. 4,680,617. This application Jul. 13, 1987, Ser. No. 72,510
Int. Cl.[4] B29C *43/18, 43/20, 43/34*
U.S. Cl. 425—117 14 Claims

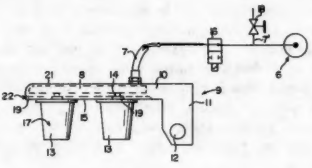


1. A molding apparatus for producing an encapsulated electronic circuit device, said mold comprising:
- an upper press member disposed above a lower press member, said upper and lower press members being relatively movable toward each other;
- heated molding means disposed between said upper and lower press members and having at a parting plane thereof ledge means for holding at least one planar conductive lead frame therein and having upper and lower mold cavity means, and
- means for placing plural sheets of prepreg, a planar conductive lead frame, and plural sheets of prepreg, in that order, between said upper and lower mold cavity means.

4,872,826
APPARATUS FOR OBTAINING A NEGATIVE PRESSURE IN CHAMBERS FORMED BY A FLAT EXTRACTOR PLATE SUPPORTING HOLLOW THERMOFORMED OBJECTS

Pietro Padovani, Todeschini, Italy, assignor to O.M.V. S.p.A. (Officine Meccaniche Veronesi), Parona, Italy

Filed Jun. 1, 1988, Ser. No. 201,556
Claims priority, application Italy, Jun. 5, 1987, 84940 A/87
Int. Cl.[4] B29C *51/44*
U.S. Cl. 425—388 13 Claims

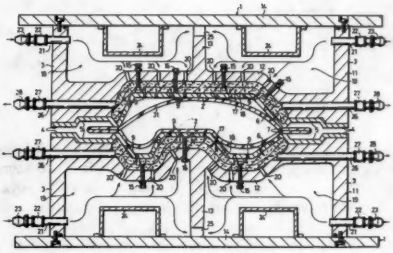


1. Apparatus for holding thermoformed objects via a negative pressure, said apparatus comprising:
- a flat extractor plate for holding hollow frustoconical or truncated pyramidal objects, said objects having rims, the plate having a connecting cavity and a lower face, the objects when resting their rims on the lower face of the extractor plate forming chambers;
- a pipe;
- a suction unit connected to said chambers by said pipe and said connecting cavity, the suction unit producing a suction to adhere the objects to the lower face of the flat extractor plate;
- a shut off valve disposed on the pipe for connecting or shutting off the chambers from the suction unit;
- an air intake adjustment valve between the suction unit and the shut-off valve; and
- atmospheric air intakes disposed on the flat extractor plate for permitting aerial communication with said chambers, the atmospheric air intakes having a cross-section that is variable and adjustable.

4,872,827
POROUS DIE

Yasuyoshi Noda, Konan, Japan, assignor to KTX Co., Ltd., Aichi, Japan

Filed Dec. 22, 1987, Ser. No. 136,914
Claims priority, application Japan, Jul. 2, 1987, 62-166469
Int. Cl.[4] B29C *39/38, 45/34*
U.S. Cl. 425—526 8 Claims



1. A porous die comprising:
- a porous die body including a back side and further including a molding surface having a plurality of pores opening therethrough;
- a cooling chamber adjacent said back side of said porous die body opposite said molding surface and communicating with said molding surface through said pores;
- at least one inlet communicating with said cooling chamber for supplying a coolant to said cooling chamber so as to cool said porous die body;
- a suction hole communicating with said cooling chamber; and
- suction means coupled to said suction hole for drawing coolant from said cooling chamber at a rate sufficient to cause air to be drawn into said cooling chamber through said pores so that the coolant and air are drawn simultaneously from said cooling chamber through said suction hole.

4,872,828
INTEGRATED FURNACE CONTROL AND CONTROL SELF TEST

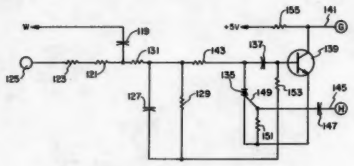
Eugene P. Mierzwinski; Michael T. Grunden, and Stephen E. Youtz, all of Ft. Wayne, Ind., assignors to Hamilton Standard Controls, Inc., Farmington, Conn.

Filed Sep. 10, 1987, Ser. No. 95,508
Int. Cl.[4] F23N *5/24*
U.S. Cl. 431—16 13 Claims

1. An integrated control for a gas-fired furnace system of the type having at least a relay controlled pilot gas valve, a relay controlled main gas valve, an inlet gas pressure sensor, an inducer fan for forcing air through a combustion chamber in the furnace, means for sensing inducer fan forced air flow through the combustion chamber, a blower fan for circulating air through the furnace, a thermostat for providing a comfort setting signal to the control, a hot air temperature sensor for

controlling the blower fan, and means operable in response to inputs from said sensors and sensing means and said thermostat to control said valves so as to operate said furnace in a safe manner, the integrated control comprising: first means for sequentially testing a plurality of the above recited furnace components prior to an attempt to ignite the furnace, second means for sequentially testing said plurality of furnace components during furnace operation, and manually operable means for sequentially testing said plurality of furnace components at times other than prior to an attempt to ignite the furnace and during furnace operation.

11. An integrated burner control system for a furnace system of the type having at least a relay controlled main gas valve, an inducer fan for forming air through a combustion chamber in the furnace, means for sensing inducer fan forced air flow through the combustion chamber, a blower fan for circulating air through the furnace, a thermostat for providing a comfort



setting signal to the control, means for controlling the blower fan, and means operable in response to inputs from said sensing means and said thermostat to control said valve so as to operate said furnace in a safe manner, the integrated control comprising:

first, second and third means, respectively operable in three different modes to test a plurality of the above recited furnace components, respectively, prior to an attempt to ignite the furnace, during furnace operation and at times other than prior to an attempt to ignite the furnace and other than during furnace operation, and

means responsive to any one of the said first, second and third means for selectively providing a visible indication if all tested components are operating in a satisfactory manner and any one of a plurality of faulty component indicative indications in the event a tested component failed the test.

4,872,829

FIRE-EXTINGUISHING DEVICE FOR OIL BURNER

Kazuharu Nakamura, Nagoya; Yoshio Mito, Gifu; Yutaka Nakanishi, Kounan; Toshihiko Yamada, Anjou; Kenji Nakamura, and Kiyonobu Itoh, both of Aichi, all of Japan, assignors to Toyotomi Kogyo Co., Ltd., Aichi, Japan

Division of Ser. No. 834,597, Feb. 28, 1986, Pat. No. 4,810,185.
This application Feb. 6, 1989, Ser. No. 306,183
Claims priority, application Japan, Mar. 1, 1985, 60-41612
Int. Cl.[4] F23N *5/24*
U.S. Cl. 431—33 **16 Claims**

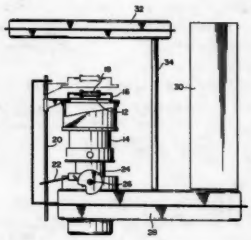
1. A fire-extinguishing device for an open-type oil burner which is adapted to discharge combustion gas generated in a combustion cylinder construction from an opening provided at a part of an outer wall of the combustion cylinder construction to the interior of a room, comprising:

a combustion cylinder construction having an opening provided at an upper portion thereof to discharge combustion gas therethrough to the interior of a room, said wick supplying fuel oil burned in said combustion cylinder construction to generate said combustion gas, and movement of said wick operating mechanism to a fire-extinguishing position causing said wick to be lowered into said wick receiving chamber such that a bad odor is generated in said combustion cylinder construction, said combustion cylinder construction defining a combustion gas chamber having an internal volume substantially larger than said wick receiving chamber;

a damper means vertically movable in relation to said opening to substantially close said opening at the fire-extinguishing;

a suction system for sucking up therein at least a part of combustion gas containing unburned fuel oil gas remaining in said combustion cylinder construction at the fire-extinguishing, said suction system comprising an air-tightly sealed tank arranged to be exposed to combustion heat from said combustion cylinder construction and communicated with said combustion cylinder construction, and said lowering of the wick causing cooling of said air-tightly sealed tank; and

connecting means for connecting said damper means to said wick operating mechanism of said oil burner such that movement of said wick operating mechanism to said fire-extinguishing position causes said damper means to be actuated through said connecting means to substantially close said opening, said substantial closure of said opening and said cooling of said air-tightly sealed tank substantially preventing said bad odor from being discharged from said oil burner to the



a wick operating mechanism for raising and lowering a wick which supplies fuel oil being burned in said combustion cylinder construction, movement of said wick operating mechanism to a fire-extinguishing position causing said wick to be lowered into a wick receiving chamber such that a bad odor is generated in said combustion cylinder construction, and said combustion cylinder construction defining a combustion gas chamber having an internal volume substantially larger than said wick receiving chamber;

damper means arranged with respect to said opening of said combustion cylinder construction to substantially close said opening at the fire-extinguishing of said oil burner;

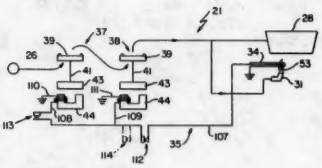
connecting means for connecting said damper means to said wick operating mechanism of said oil burner such that movement of said wick operating mechanism to said fire-extinguishing position causes said damper means to be actuated through said connecting means to substantially close said opening of said combustion cylinder construction such that said bad odor is substantially prevented from being discharged from said oil burner to the interior of said room at the fire-extinguishing of said oil burner.

4,872,830

BURNER CONTROL DEVICE, SYSTEM AND METHOD OF MAKING THE SAME

Jay R. Katchka, Cypress; George A. Yeaman, and Richard W. McKinney, both of Lakewood, all of Calif., assignors to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 918,525, Oct. 14, 1986, Pat. No. 4,728,283, which is a division of Ser. No. 767,721, Aug. 20, 1985, Pat. No. 4,640,676. This application Dec. 14, 1987, Ser. No. 132,561
The portion of the term of this patent subsequent to Feb. 3, 2004, has been disclaimed.
Int. Cl.[4] F23Q *9/08*
U.S. Cl. 431—54 10 Claims



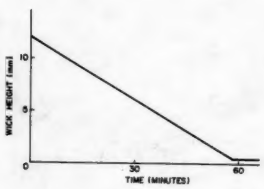
1. In a control device for supplying fuel to a main burner means, said device comprising a housing means having an inlet means for being interconnected to a source of fuel and having a first outlet means for being interconnected to said main burner means and a second outlet means for being interconnected to a pilot burner means for said main burner means, and first and second control valve means carried by said housing means and being in series to connect said inlet means to said first outlet means through both of said control valve means only when both of said control valve means are in an open condition thereof, each said control valve means comprising a movable valve member resiliently biased closed and an independent electromagnetic valve member latching means energizable to hold its respective said valve member open and deenergizable to allow its respective said valve member to close, each said control valve means having movable means to open its respective said valve member to a latching position so as to be held open by its respective said latching means when its respective said latching means is energized, the improvement wherein said control valve means are adapted to interconnect said inlet means to said second outlet means through both of said control valve means only when both of said control valve means are in an open condition thereof.

4,872,831

KEROSENE HEATER PROVIDING AUTOMATIC WICK REPOSITIONING AFTER IGNITION

Masayuki Fujimoto, Nara; Muneo Tao, Yamatokoriyama, and Kuniaki Uchida, Kashihara, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Feb. 16, 1988, Ser. No. 156,436
Claims priority, application Japan, Feb. 16, 1987, 62-33059
Int. Cl.[4] F23N *5/00*
U.S. Cl. 431—73 12 Claims



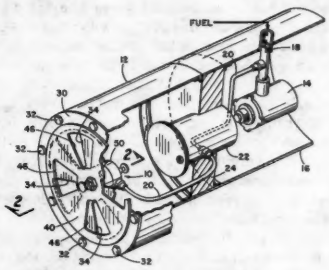
1. A kerosene heater comprising:
a wick which is movable upward and downward and which can be ignited when raised to an upper position and is extinguished when moved to a lowered position;
a wick raising and lowering apparatus for executing upward and downward movement of said wick; and,
fuel consumption saving means for driving said wick raising and lowering apparatus to automatically lower said wick from said upper position to a predetermined position which is within a range of combustion positions of said wick after said wick has remained at said upper position for a predetermined time interval.

4,872,832

AIR CONTROLLER FOR BURNERS

Jack L. Alexander, 260 E. 28th St., Tulsa, Okla. 74114

Filed Dec. 11, 1987, Ser. No. 131,855
Int. Cl.[4] F23N *3/00*
U.S. Cl. 431—90 7 Claims

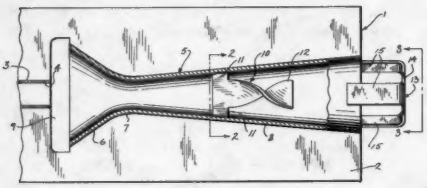


1. An adjustable air control register for a fuel burner comprising:
a fixed member having multiple apertures for the flow of air therethrough;
a second apertured member coaxially contiguous thereto on one side of said fixed member and rotatable relative thereto to change the amount of air flow through said aperture of said fixed member;
a housing coaxially attached to the other side of said fixed member, a coaxial cavity internally of said housing, said cavity divided by a flexible diaphragm into inner and outer chambers, a coaxial cylinder in said inner chamber, a piston reciprocable in said cylinder having one end attached to said diaphragm and the other end within said cylinder, cam or follower means formed as a part of said other end of said piston;
means within said inner chamber to normally bias said piston toward said outer chamber;
a rotor, said rotor having one end coaxially attached to said second member, the other end of said rotor having follower or cam means in contact with said respective cam or follower means, said cam and follower designed such that reciprocation of said piston will rotate said rotor and second member;
a first adjustable stop member in said outer chamber to limit the movement toward said outer chamber and a second adjustable stop member in said inner chamber to limit movement of said piston in direction toward said inner chamber to establish minimum and maximum amounts of air flow through said fixed member apertures, respectively; and
means to communicate the quantity, pressure or flow of that is going through the burner to fuel to said outer chamber, said diaphragm being responsive thereto to automatically vary the amount of air flow through said fixed member apertures.

4,872,833
GAS BURNER CONSTRUCTION

David W. Kramer, Milwaukee, Wis., assignor to A. O. Smith Corporation, Milwaukee, Wis.

Filed May 16, 1988, Ser. No. 194,976
Int. Cl.[4] F23D *14/62*
U.S. Cl. 431—354 10 Claims

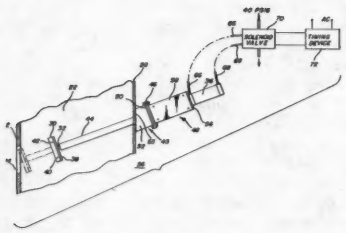


1. A gas burner, comprising a conduit connected to a source of fuel gas and having an outlet, a venturi having a generally circular cross section and disposed downstream of said outlet and having a converging section spaced radially outward of said outlet to provide an annular air intake passage, said venturi also including an intermediate throat section disposed downstream of said converging section and a diverging section disposed downstream of said throat section, a baffle disposed in said venturi and having an upstream end secured to the inner surface of said diverging section at a location spaced downstream of said throat section, said baffle having a helical configuration and the portion of said baffle located downstream of said upstream end being spaced out of contact with the diverging section of said venturi, and target means spaced outwardly from the downstream end of said diverging section to spread the combustible mixture of gas and air and provide a relatively short flame pattern.

4,872,834
RECOVERY BOILER PORT CLEANER

John W. Williams, Jr., 5501 Outley Dr., Mobile, Ala. 36693

Filed Nov. 9, 1988, Ser. No. 268,775
Int. Cl.[4] F27D *23/00*
U.S. Cl. 432—75 17 Claims



1. Apparatus for cleaning an air opening in a furnace, comprising:

an elongated push rod;

an actuator coupled to said push rod for providing a reciprocatory linear motion of the push rod to and from said air opening;

a cleaning blade orthogonally attached to one end of said push rod and being operable to clean debris from the edges of said air opening when said push rod is actuated by said actuator to translate said blade to said air opening;

means for mounting said apparatus on a wall of said furnace;

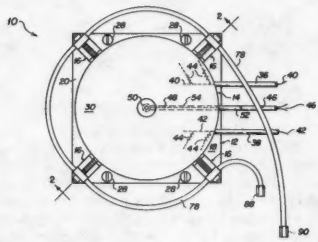
means for attaching said actuator in stand off relationship with said mounting means to position said actuator a predetermined distance away from the wall of said furnace to provide heat protection for said actuator from the extreme heat radiated from the furnace; and

an elongated protective sleeve for said push rod extending from said attaching means to a position adjacent said cleaning blade when said blade is positioned away from said air opening.

4,872,835
HOT CHUCK ASSEMBLY FOR INTEGRATED CIRCUIT WAFERS

Barclay J. Tullis, Palo Alto, and Richard G. Baer, Los Altos Hills, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jul. 24, 1986, Ser. No. 889,548
Int. Cl.[4] F24J *3/00*
U.S. Cl. 432—225 22 Claims



2. A hot chuck assembly comprising:

base means;

chuck means including:

a platen having a top, substantially horizontal, planar, wafer support surface and an opposing bottom surface; and

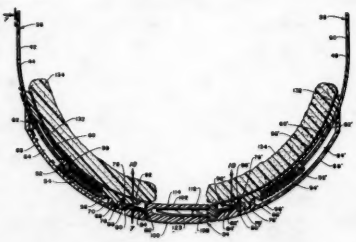
heater means for heating said platen; and

support means coupled to said platen proximate to said support surface and distal from said bottom surface, said support means being adapted to support said chuck means over said base means such that said wafer support surface remains in a substantially constant horizontal plane regardless of the temperature of said platen.

4,872,836
RELEASABLE EXTRAORAL ORTHODONTIC APPLIANCE

James E. Grove, 6514 Graves Ave., Van Nuys, Calif. 91406

Filed Apr. 8, 1985, Ser. No. 721,240
Int. Cl.[4] A61C *7/00*
U.S. Cl. 433—5 6 Claims



1. An orthodontic appliance adapted to be located about the head of an individual for applying force to the teeth of the individual through teeth mounted braces for the purpose of

achieving proper occlusion, said orthodontic appliance comprising:

an encircling assembly adapted to be located about the head of the individual, said encircling assembly being generally composed of a front section and a rear section which are connected together by side sections;

said front section including connecting means for facilitating connection to the teeth mounted braces;

said rear section to be located at the back of the head of the individual, said rear section including a single disconnection means which disconnects upon applying of a predetermined amount of force to said front section in a direction away from said rear section;

each said side section being extendible in length from a retracted position to an extended position upon application of said predetermined amount of force, each said side section including resilient means, said resilient means applying a force to said front section tending to locate said side sections in said retracted position;

said disconnection means comprises a separable coupling device composed of a male member and a female member, said male member including release means which is activated upon said predetermined amount of force being reached;

said release means comprising a cam assembly, said cam assembly being capable of causing deflection of said male member to effect separation of said male member from said female member; and

said coupling device further including deflection means for a second way to separate said male and female members, said deflection means comprising a pair of arms formed on said male member, each said arm connecting with a cutout opening formed in said female member, said cutout openings permitting direct manual contact with said arms to cause deflection of said arms toward each other to also result in separation of said male member from said female member.

4,872,837

SURGICAL OR DENTAL INSTRUMENT AND CANNULAE FOR ASPIRATING, CLEANING, DRYING AND ILLUMINATING

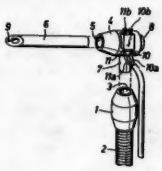
Robert Issalene, 7, rue Ampère, 83100 Toulon, and Jean-François Lantrua, "La Campagne" Lot. les Grés Macany, 83400 Hyeres, both of France

Filed Feb. 3, 1988, Ser. No. 151,537

Claims priority, application France, Feb. 6, 1987, 87 01569

Int. Cl.[4] A61C *3/00, 17/02, 17/04*

U.S. Cl. 433—29 **5 Claims**



1. A surgical or dental instrument comprising a hollow body incorporating means for connecting it to a suction pipe, means for fitting thereon a removable cannula, means for supplying fluid which will be conveyed to the end of said cannula, and a supply of electrical current for illuminating a bulb, wherein

said hollow body contains a sleeve, made of a transparent material having a refraction coefficient greater than that of air, traversed by an axial bore whose diameter is equal to the inner diameter of said cannula, said sleeve comprising, on its periphery, a housing in which is placed said bulb which emits light in the direction of said cannula, said cannula being removably connected to said hollow body;

said cannula is made of a transparent material having a refraction coefficient greater than that of air, the rear end of said cannulae is, when said cannula is fitted in said hollow body, in contact with the front end of said sleeve, so that the light generated by said bulb is conveyed in said sleeve then in said cannula of which the wall performs the role of light conductor; said cannula further comprising in its wall longitudinal conduits for transporting said fluids, said conduits opening out, on the one hand, at the outer end of said cannula and, on the other hand, in the vicinity of the other end of the cannula on the outer wall of said cannula at two points which are offset longitudinally and which communicates with spaces disposed between spaced O-rings arranged in the inner face of said hollow body, into which the ends of the means for supplying said fluids also open out;

said cannula and said hollow body being at the level of those parts of these pieces corresponding to the fit, of cylindrical section, so that said cannula may pivot on itself in said hollow body.

4,872,838

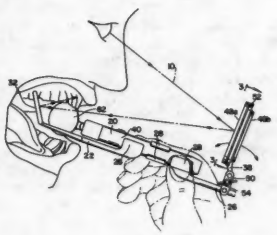
ORAL INSPECTION DEVICE

Wade Canter; Kimberly Canter, both of 23675 Park Andorra, Calabasas Park, Calif. 91302; Shawn Canter, and Chip Canter, both of 19274 Berclair La., Tarzana, Calif. 91356

Filed Jun. 29, 1987, Ser. No. 67,306

Int. Cl.[4] A61C *3/00*

U.S. Cl. 433—31 **16 Claims**



1. An oral inspection device for allowing self-inspection of a person's oral cavity, comprising:

an elongated body having a longitudinal axis suited for gripping by said person's hand and containing illuminating means at a first end thereof;

at least three elongated support means each having a first end detachably mounted on a said elongated body and a second end for supporting oral inspection and cleaning means wherein each of said support means are free to slideably move along said elongated body substantially parallel to said longitudinal axis and rotate about said longitudinal axis;

a first of said elongated support means extending laterally and longitudinally away from said first end of said elongated body, said first elongated support supporting first oral inspection and cleaning means comprising means for biasing a person's cheek and tongue away from said longitudinal axis of said elongated body such that said illuminating means can provide unobstructed illumination of said person's oral cavity;

a second of said elongated support means extending longitudinally away from said first end of said elongated body for supporting a second oral inspection and cleaning means within said person's oral cavity while a portion of said elongated body remains without said oral cavity, said second oral inspection and cleaning means including a primary mirror for receiving an image of a portion of the

person's oral cavity which is being observed, and reflecting said image; and,

a third of said elongated support means extending from a second end of said elongated body, said third elongated support means supporting a secondary mirror means for receiving said reflected image from said primary mirror and re-directing that image to the person's eye for viewing of said portion of the person's oral cavity during the operation of said device.

4,872,839

SPACER FOR DENTAL IMPLANTS

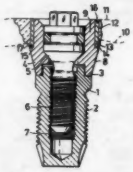
Izidor Brajaovic, Gothenburg, Sweden, assignor to Nobelpharma AB, Gothenburg, Sweden

Filed May 18, 1988, Ser. No. 195,334

Claims priority, application Sweden, Jun. 12, 1987, 8702445

Int. Cl.[4] A61C 8/00

U.S. Cl. 433—173 6 Claims



1. A spacer for dental implants constituting a connection element in a removable screw connection between an anchorage element implanted in the maxillary beneath the gingiva, and a dental prosthesis construction whose joint surface is disposed above the gingiva, said spacer comprising:

a tubular spacer member made of a bio-compatible material such as titanium for absorbing the loadings of the screw connection;

said tubular spacer element having a lower, substantially conically tapered portion for gingival penetration and an upper cylindrical portion projecting above the gingival edge and extending from said conically tapered portion up to the joint surface of the prosthesis construction;

the outer diameter of the lower end part of said conically tapered portion substantially corresponding to the outer diameter of the upper portion of the anchorage element;

a covering sleeve of a tooth-like material provided substantially around said cylindrical portion of the spacer element; and

wherein said covering sleeve is not subjected to any loadings of the screw connection.

4,872,840

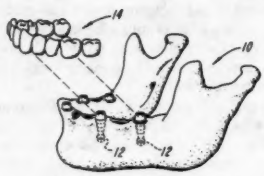
DENTAL IMPLANT AND METHOD

Jacques E. F. Bori, Watertown, Mass., assignor to Team Incorporated, Newton, Mass.

Filed Jul. 15, 1987, Ser. No. 73,489

Int. Cl.[4] A61C 8/00

U.S. Cl. 433—173 33 Claims



1. A dental implant having a shaft and a bulbous end attached thereto, with the bulbous end having a diameter greater than the remainder of the shaft to which it is attached, said implant having tightly captured bone channelled substantially through the implant, a portion of said bone being exposed at a surface of said implant for stimulating osteointegration through the guiding of new bone growth into said implant so as to provide more than surface attachment to said implant, said implant providing a mechanical anchoring via bone growth through said implant.

4,872,841

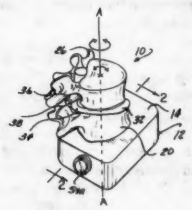
DEMONSTRATION DEVICE FOR ILLUSTRATING SPINAL MISALIGNMENT

Kenneth L. Hamilton, 22706 Gordon Switch, St. Clair Shores, Mich. 48081, and Timothy C. Butler, 2929 Acorn La., Howell, Mich. 48843

Filed Jun. 20, 1988, Ser. No. 208,680

Int. Cl.[4] G09B 23/32

U.S. Cl. 434—274 8 Claims



1. An education display device, representing a portion of a spine, useful for illustrating the effect of a misaligned spine vertebrae on the operation of a nerve trunk disposed within the spine, said device comprising:

a first lower member configured to resemble a vertebrae;

a second upper member configured to resemble a vertebrae, movably mounted above said first lower member;

means for movably mounting said second upper member above said first lower member;

a flexible member configured to resemble a nerve trunk, mounted in side-lying anatomically appropriate relationship with said vertebrae;

a power source;

a wiring harness, having first and second ends, mounted with said flexible member, extending from said power source through said flexible member to at least one end of said flexible member;

at least one light emitting diode fixed to said first end of said wiring harness remote from said power source, and protruding from said flexible member proximate to the first lower member and second upper member;

circuit means, mounted within a unitary hollow display base, for operating said light emitting diode in an ON/OFF configuration at a frequency which varies depending on the position of said first and second members in relation to each other, and connected to said second end of said wiring harness;

a first switching means attached to said first and second members operating to switch said circuit means from one frequency of ON/OFF operation to a second frequency of ON/OFF operation dependent upon the position of said first and second members in relation to each other;

second switching means attached to an exterior surface of said base for activating said circuit means;

wherein movement of the first and second members with relation to one another will change the frequency of ON/-OFF flashing of the light emitting diode visually indicating the interruption of nerve signal flow which occurs

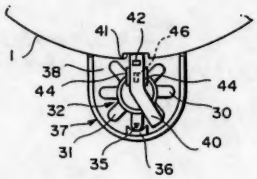
upon dislocation of spinal bones with relation to one another.

4,872,842

ELECTRIC CONNECTING DEVICE

Tsutomu Ishima, Utsunomiya, and Kinihiko Sasaki, Miyagi, both of Japan, assignors to Alps Electric Co., Ltd. and Honda Motor Co., Ltd., both of, Japan

Filed Oct. 31, 1988, Ser. No. 265,119
Claims priority, application Japan, Nov. 4, 1987, 62-167859
Int. Cl.[4] H01R *35/00*
U.S. Cl. 439—15 **3 Claims**



1. An electric connecting device, comprising a fixed member, a movable member mounted for rotation on said fixed member, a cable for electrically connecting said fixed member and said movable member to each other, a rotational position detector provided between said fixed member and said movable member and including a gear which is rotated by a predetermined angle each time said rotatable member is rotated for one full rotation, said rotational position detector detecting a rotational position of said movable member in accordance with a position of a tooth of said gear, and a resilient member removably mounted on said rotational position detector for engaging with said movable member to facilitate precise positioning of said movable member relative to said fixed member.

4,872,843

INTERCONNECTION SYSTEMS FOR ELECTRICAL CIRCUITS

Michael J. Anstey, Wokingham, United Kingdom, assignor to Dowty Electronic Components Limited, Buckinghamshire, United Kingdom

PCT No. PCT/GB87/00203, § 371 Date Nov. 23, 1987, § 102(e) Date Nov. 23, 1987, PCT Pub. No. WO87/06092, PCT Pub. Date Oct. 8, 1987
PCT Filed Mar. 24, 1987, Ser. No. 123,160
Claims priority, application United Kingdom, Mar. 25, 1986, 8607299; Apr. 5, 1986, 8608360; Japan, Aug. 20, 1986, 8620211; United Kingdom, Oct. 23, 1986, 8625352
Int. Cl.[4] H01R *9/09*
U.S. Cl. 439—69 **16 Claims**

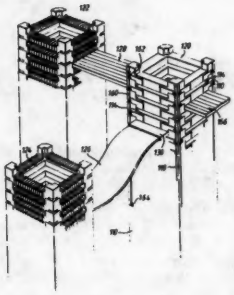
1. An interconnection unit for interconnecting two-sided chip carriers comprising,

a plurality of mechanically interlocking spacer elements arranged in a stack, each of at least some of said spacer elements including at least one elongate support member having an upper surface, for supporting a chip carrier, a lower surface and side surfaces,

a plurality of electrically conductive contact clips distributed along the support member in spaced relationship with one another, each contact clip comprising a first part, a second part, and a third part uniting the first and second parts,

location means on the support member for locating each said contact clip at a respective position on the support member, the contact clip embracing the support member so that the first and second parts thereof are disposed adjacent the said upper and lower surfaces respectively of the support member, wherein the said upper and lower surfaces of immediately adjacent support members in the stack define a respective aperture in the stack enabling an external electrical connection to be made to one or more of the contact clips disposed adjacent to said upper and lower surfaces, and

said first part of each contact clip is capable of establishing an electrical connection with a respective contact pad on the lower surface of a chip carrier supported by said



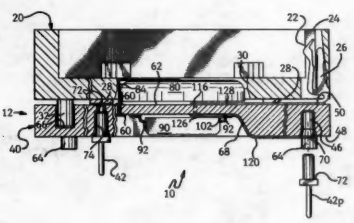
support member, and said second part of each contact clip is capable of establishing an electrical connection with a respective contact pad on the upper surface of a chip carrier supported by a support member of an immediately underlying spacer element in the stack so that said contact pads are connected together electrically via said first, second and third parts of the contact clip.

4,872,844

COMPONENT-CARRYING ADAPTER FOR CHIP CARRIER SOCKET

Robert K. Grebe, Scottsdale; John E. Lucius, Glendale, and David S. Szczesny, Glendale, all of Ariz., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jul. 8, 1988, Ser. No. 216,927
Int. Cl.[4] H01R *23/72*
U.S. Cl. 439—69 **20 Claims**



1. A substrate for being secured to an electronically active chip carrier socket for interconnecting an integrated circuit chip with a circuit panel, the socket having a plurality of contact means engaged with a like plurality of contact means of the carrier for the integrated circuit chip and required to be electrically connected to a like plurality of contact means of the circuit panel, to define with the socket an assembly desired to include at least one electrical component to be interposed along at least one electrical interconnecting circuit between the circuit panel and the integrated circuit chip, the substrate comprising:

a directional member molded of plastic material and having a generally planar shape, said dielectric member having a panel-mounting face and a socket-mounting face;

a plurality of first contact means being disposed along said panel-mounting face and associated with a respective plurality of contact means of a circuit panel and adapted to be electrically connected therewith upon mounting of said panel-mounting face of said dielectric member to said circuit panel;

a plurality of second contact means being disposed along said socket-mounting face and associated with a respective plurality of contact means of a chip carrier-receiving socket and adapted to be electrically connected therewith upon mounting of said socket to said socket-mounting face;

a least a selected one of associated said first and second contact means being electrically isolated on said dielectric member, and continuous conductive paths electrically connecting remaining ones of said first contact means and said second contact means desired to remain unaffected by an at least one electrical component disposed between said circuit panel and said socket;

said dielectric member including at least one component-receiving region on one of said panel-mounting face and said socket-mounting face for receiving a corresponding said at least one electrical component securable thereonto;

said dielectric member including at least one third and at least one fourth contact means, said at least one third contact means disposed in said at least one component-receiving region and adapted to be electrically connected to corresponding panel-side contact means of said at least one electrical component, said at least one third contact means being electrically connected to said selected at least one first contact means by first conductive path segments, said at least one fourth contact means disposed in said at least one component-receiving region and adapted to be electrically connected to corresponding socket-side contact means of said at least one electrical component, and said at least one fourth contact means being electrically connected to said selected at least one second contact means by second conductive path segments;

said continuous conductive path means, said first and second conductive path segments, and at least portions of said first, second, third and fourth contact means being plated onto respective selected surface regions of said dielectric member after molding of said member, whereby

said selected at least one first contact means and associated said selected at least one second contact means become electrically connected upon the mounting of said at least one electrical component to said dielectric member.

4,872,845

RETENTION MEANS FOR CHIP CARRIER SOCKETS

Iosif Korsunsky; Kevin E. Walker, and Robert W. Brown, all of Harrisburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 116,770, Nov. 30, 1987. This application May 6, 1988, Ser. No. 191,635
Int. Cl.[4] H01R *23/72*
U.S. Cl. 439—70 **19 Claims**

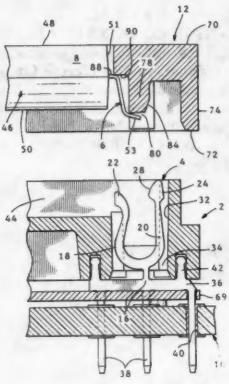
1. A chip carrier socket comprising:

a chip carrier receiving member having a chip carrier receiving opening extending therethrough, the chip carrier receiving opening having apertures provided proximate thereto for receiving resilient means therein;

a housing member having a first major surface and a second major surface, resilient securing portions provided on the first major surface, resilient means extend from, and are integral with the resilient securing portions, the resilient members extend beyond the second major surface,

each of the resilient securing portions being integral with the first major surface of the housing member on a plurality of sides thereof, the resilient securing portion being spaced from the first major surface on a plurality of sides thereof,

whereby as the chip carrier receiving member is moved into engagement with the housing member, the resilient means is caused to resiliently deform, which in turn causes the resilient securing portion to resiliently deform, and after the chip carrier receiving member is positioned in place on



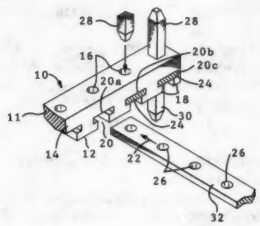
the housing member, the resilient means is allowed to moved to an unstressed position, thereby securing the chip carrier receiving member to the housing member.

4,872,846

SOLDER CONTAINING ELECTRICAL CONNECTOR AND METHOD FOR MAKING SAME

Thomas C. Clark, 301 N. 17th St., Camp Hill, Pa. 17011

Filed Jul. 21, 1988, Ser. No. 222,655
Int. Cl.[4] H01R *9/09*
U.S. Cl. 439—83 **16 Claims**



1. An electrical connector comprising:

a housing which defines a receiving channel;

a reflowable element disposed within the channel;

a conductive pin mounted in the housing and passing through the channel;

said channel defining a loading axis angled with respect to the pin such that the loading axis is non-parallel to the pin;

said channel shaped to receive the reflowable element along the loading axis and positively to retain the reflowable element from movement along the pin;

said pin preventing the reflowable element from moving along the loading axis out of the channel.

4,872,847

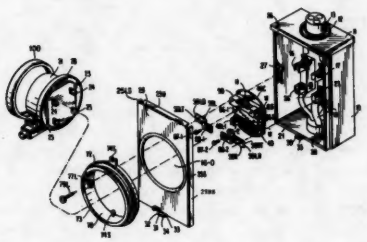
PILFER PROOFING SYSTEM FOR ELECTRIC UTILITY METER BOX

Robert B. Fennell, 241 Deerfield Rd., Bloomingdale, Ga. 31302; David H. Fritts, 142 Jefferson St., Savannah, Ga. 31412, and David S. LeGasse, P.O. Box 99, Walpoles, N.H. 03608

Continuation-in-part of Ser. No. 98,699, Sep. 18, 1987, abandoned, which is a continuation-in-part of Ser. No. 694,368, Jan. 24, 1985, Pat. No. 4,615,113, which is a division of Ser. No. 526,236, Aug. 25, 1983, Pat. No. 4,505,530, which is a division of Ser. No. 170,205, Aug. 18, 1980, Pat. No. 4,404,521. This application Mar. 1, 1988, Ser. No. 162,517

Int. Cl.[4] H01R *13/52*

U.S. Cl. 439—133 11 Claims



1. In a pilfer proofing apparatus for a plug-in utility meter and base box of the type having a meter base box, a pair of meter stops fastened to said base box at diametrically opposite sides of said opening through which said glass meter cover normally projects, a plug-in electric meter having a glass meter cover, rearwardly projecting male connectors and an annular flange, a plug-in terminal block set and a meter box cover having an opening therein through which said glass meter cover of said electric meter passes to plug and engage said rearwardly projecting male connectors in said terminal block set to pilfer proof same without electrically disconnecting the meter base box and terminal block set from the electrical power line, said pilfer proofing apparatus including,

(a) rigid insulated carrier means, a plurality of male conductor plug elements projecting on one side of said insulated carrier means, and

a like numbered plurality of female conductor socket elements, each integrally formed with a respective one of said male conductor plug elements and projecting from the opposite side of said carrier member,

(b) a locking ring member constituted by a meter box cover engaging member and in integral annular locking ring projection projecting outwardly from the plane of said meter box cover engaging member and through said opening in said meter box cover,

(c) anchor means adapted to be secured to said meter base box, said anchor means including a pair of insulated anchor bars having means for adjustably securing first ends of said anchor bars to said insulated carrier means, and second ends of said anchor bars having bifurcated ends with bifurcations spacedly projecting under said meter stops at said diametrically opposite sides of said opening to accommodate a wider variety of meter boxes and form a plurality of bearing points for engagement with said meter stops and better distribute the load on said meter box cover and make it more difficult to defeat by a would-be pilferer,

(d) screw means fully passing through said locking ring member to threadably engage with threaded bores in said anchor bars to clamp said locking ring and said meter box cover to said meter stops with each spaced bifurcation providing a of bearing point on said meter stops for each anchor bar,

(e) removable insulated blade members releasably retained in at least electrically energized ones of said female conductor socket elements during the installation of elements (b), (c) and (d), and

(f) an annular locking ring means engaging said annular flange on the base of said meter and said locking ring projection for securing said meter to said locking ring member and meter base box whereby said projecting male connectors are prevented from being unplugged from said contact terminal block set and said meter base box without removing said annular locking ring.

4,872,848

COVER FOR A MULTIPOINT CONNECTOR

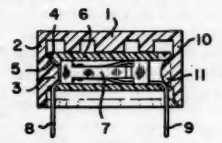
Bob Mouissie, Berlicum, Netherlands, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 3, 1988, Ser. No. 266,892

Claims priority, application Fed. Rep. of Germany, Nov. 9, 1987, 8714913[U]

Int. Cl.[4] H01R *13/44*

U.S. Cl. 439—135 8 Claims



1. A cover for a multipoint connector having a block-shaped multipoint connector body with lateral surfaces, said connector having electrical contacts with connecting pins disposed within spaces of the body, said contacts being accessible from the outside through apertures provided in said lateral surfaces of the connector body, said cover comprising an upper part and four lateral parts extending substantially perpendicularly to said upper part to define an open end for the cover into which the connector is received, at least two of said lateral parts having inner surfaces which face the apertures in said lateral surfaces of the multipoint connector body when said cover is inserted over the connector, said inner surfaces being provided with knobs aligned so as to lie opposite each aperture and rest against the edge of each respective aperture when the cover is placed on the connector.

4,872,849

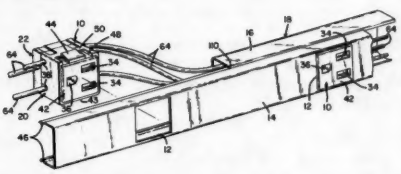
CHANNEL OUTLET

William B. Long, Camp Hill, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 396,222, Jul. 8, 1982, abandoned. This application Dec. 5, 1984, Ser. No. 678,369

Int. Cl.[4] H01R *13/60, 4/24*

U.S. Cl. 439—209 8 Claims



1. A channel outlet electrical connector assembly, comprising:

channel-housing means including cover means and base means, said cover means having spaced openings therealong, means maintaining said cover means and said base means together;

channel outlet means disposed in said channel-housing means at each of said openings and including terminal-housing means and cover member means of rigid insulative material, said terminal-housing means having power terminal-receiving cavities and a ground terminal-receiving cavity therein, a front section of each of the terminal-housing means disposed in respective spaced openings of said cover means of said channel-housing means and having apertures therethrough leading to the respective terminal-receiving cavities, means provided by said channel outlet means and said channel-housing means securing said channel outlet means in the respective spaced openings of said cover means;

power terminal means respectively disposed in said power terminal-receiving cavities and ground terminal means disposed in said ground terminal-receiving cavity, said power terminal means and said ground terminal means have conductor-terminating means including slots therein positioned adjacent an inner end of said terminal-housing means, wherein insulated electrical conductors are respectively terminated in said conductor-terminating means upon said conductors being pushed into the respective slots so that the slotted conductor-terminating means cut through the insulation and electrically connect with the electrical conductor, said power terminal means having receptacle section means in alignment with respective apertures, said ground terminal means having spring contact means extending along said ground terminal-receiving cavity toward the aperture in alignment therewith and ground contact means extending substantially parallel with respect to said conductor-terminating means of said ground terminal means, said apertures in alignment with said receptacle section means and said spring contact means being offset from the respective conductor-terminating means of said power terminal means and said ground terminal means so that the electrical conductors terminated in the respective conductor-terminating means are positioned to the side of the respective apertures;

means provided by said terminal means and said terminal-housing means securing said power terminal means in said power terminal-receiving cavities and said ground terminal means in said ground terminal-receiving cavity opposite outer surfaces of said terminal-housing being formed with depressed open channels therein, a strap member extending across the mouth of each of the channels intermediate its ends, said cover member having a plurality of spaced leg members extending from the rim thereof to respectively slide along the channels when the cover is moved to close the housing, said legs having protruding wedge-shaped portions engageable with the strap members to latch the cover in place, said cover member means having an opening through which said ground contact means extends and electrically connects with said base means.

4,872,850

IC TESTER SOCKET

Hiroyuki Mogi, and Kazuhisa Ozawa, both of Kawaguchi, Japan, assignors to Dai-ichi Seiko Kabushiki Kaisha, Kawaguchi, Japan

Continuation of Ser. No. 946,584, Dec. 23, 1986. This application Jun. 8, 1988, Ser. No. 207,101

Claims priority, application Japan, Dec. 30, 1985, 60-204384; Sep. 1, 1986, 61-133941

Int. Cl.[4] H01R *9/09, 13/631*

U.S. Cl. 439—264 **1 Claim**

1. An IC testing socket having a chip accomodating space defined therein for accomodating a insertable IC chip having a plurality of terminals, comprising:

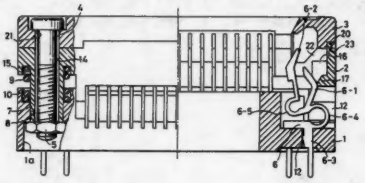
a socket body;

a contacting pin extending from the socket body and including:

(a) a base portion secured to the socket body,

(b) a contact portion disposed to move toward and away from the chip accomodating space to respectively mate and unmate with a corresponding terminal of the IC chip,

(c) a first arcuate spring portion coupling the contact portion to the base portion in a manner such that the contact portion is located out of the chip accomodating space when the first arcuate spring is not under spring load thereby facilitating insertion of an IC chip into the chip accomodating space, and



(d) an actuator arm extending from the arcuate spring portion; and

actuating means, engageable with the actuator arm of the contacting pin, for imparting a force to overcome the resiliency of the first arcuate spring portion and move the contact portion of the contacting pin toward the chip accomodating space to contact a terminal of an IC chip therein.

4,872,851

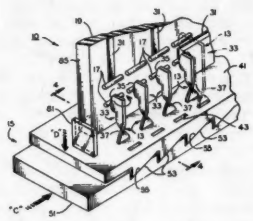
ELECTRICAL CONNECTOR WITH TORSIONAL CONTACTS

Robert Babuka, Vestal, and James R. Petrozello, Endicott, both of N.Y., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Feb. 27, 1989, Ser. No. 316,041

Int. Cl.[4] H01R *11/22*

U.S. Cl. 439—267 **18 Claims**



1. An electrical connector for providing electrical connection to at least one contact element located on a substrate, said connector comprising:

a base member;

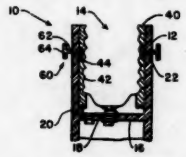
at least one torsional contact for contacting said contact element located on said substrate to provide said electrical connection, said torsional contact adapted for occupying a first, twisted orientation relative to said substrate and a second, substantially non-twisted orientation relative to said substrate; and

means for engaging said torsional contact to cause said contact to move from said first, twisted orientation to said second, substantially non-twisted orientation.

4,872,852
CHILD RESISTANT ELECTRICAL SOCKET OR SOCKET ATTACHMENT

Bernard G. Palitz, Jr., R.F.D. 4, 431 Haines Rd., Mount Kisco, N.Y. 10549

Filed Dec. 23, 1988, Ser. No. 290,482
Int. Cl.[4] H01R *17/04, 33/97*
U.S. Cl. 439—307 6 Claims



1. A child resistant electrical light socket for resisting removal of a threaded base of a standard light bulb therefrom comprising in combination:

(a) an outer cylindrical portion having an open upper end to receive said base of said bulb and a base with a pair of electrical contact elements;

(b) an inner cylindrical sleeve rotatably mounted within said outer portion having standard internal screw threads for receiving the threaded base of said bulb, at least one recess in its outer wall and a slidable electrical connection to one of said base contact elements;

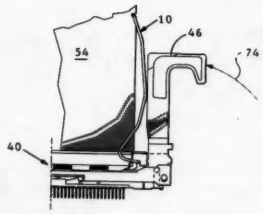
(c) moveable means mounted in the outer cylindrical portion for securing said inner sleeve and preventing rotation thereof by mating with said inner sleeve recess comprising a member projecting inwardly through the sidewall of said outer portion; and

(d) means for retracting said inwardly projecting member whereby said inner sleeve rotates freely within said outer portion unless said member engages said recess.

4,872,853
CIRCUIT CARD RETAINING DEVICE

Van K. Webster, Camp Hill, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 8, 1988, Ser. No. 281,579
Int. Cl.[4] H01R *13/629, 13/635*
U.S. Cl. 439—327 4 Claims

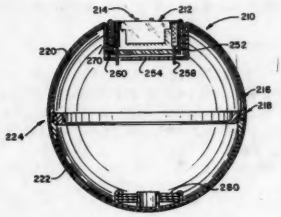


1. A retaining device for card edge connectors which receive circuit cards having a slot in one side thereof and which are inserted into the connector with the slot being at a predetermined distance therefrom, said retaining device comprising an elongated, U-shaped member formed from spring wire and having parallel legs joined at one end by a bight and having free ends pivotally attached to the connector at one end thereof, said legs including parallel concavo-convex shaped portions between said bight and said free ends whereby the length of said member may be resiliently elongated to a predetermined length to enable said bight to be placed in the slot in the circuit card which may be placed in the connector and thereby exert a retaining force on the circuit card to hold it in the connector.

4,872,854
SIMULATED BALL USED IN SPORTS INCORPORATING AN ELECTRONIC COMPONENT

Victor C. Hesu, St. Louis, Mo., assignor to Hyman Products, Inc., Maryland Heights, Mo.

Filed Mar. 23, 1988, Ser. No. 172,016
Int. Cl.[4] H01R *3/00*
U.S. Cl. 439—577 36 Claims

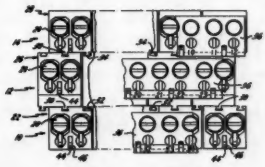


1. A simulated ball used in sports having an electronic component mounted therein with exposed controls for operation by a user, said ball including a hollow body over which a complementary shaped flexible ball cover is mounted, said body receiving said electronic component in a recess provided in an outer wall of said hollow body, said body including means associated therewith to position and hold said electronic component within said hollow body, said complementary shaped flexible ball cover having a corresponding opening there through to allow exposure of the controls of the electronic component, said ball cover being drawn in generally close-fitting and conforming relationship to the outer wall of said hollow body including at least partially within the recess thereof; and said body being formed from two generally curvilinearly shaped thin-walled plastic half sections which terminate in complementary interfitting free end portions, a thin-walled plastic disc-shaped element extending substantially across the hollow body and structurally inter-engaging the complementary interfitting free end portions to provide laterally outwardly directed and circumferentially extending support therefor.

4,872,855
ADJUSTABLE TERMINAL BLOCK EQUIPMENT

Alexander R. Norden, New York, N.Y., assignor to Connectron, Inc., Laurence Harbor, N.J.

Filed Jun. 3, 1988, Ser. No. 202,801
Int. Cl.[4] H01R *9/22*
U.S. Cl. 439—717 26 Claims



11. Apparatus for making electrical connections to electrical equipment having at least one row of many equipment terminals whose distribution is alternatively at inch-based or metric-based modular intervals along the row, said apparatus includ-

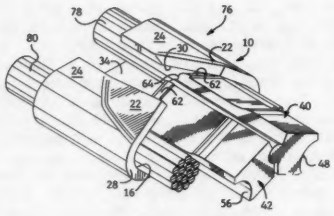
ing at least one group of terminal blocks having electrical terminals which are distributed along a row and which are distributed for cooperation with said equipment terminals, respectively, said terminal blocks having wire fastening terminals connected to said electrical terminals, respectively, said terminal blocks being movable relative to one another along their row, the electrical terminals of each of said terminal blocks being so limited in number and each electrical terminal being so located on its respective terminal block that the terminals of said terminal blocks are cooperable with respective equipment terminals regardless of whether the distribution of the equipment terminals is at inch-based or metric-based modular intervals, and an elongated locating member assembled to said one row of terminal blocks for fixing the distribution of the terminals thereof, said member having terminal-block locating formations distributed at one of said modular intervals.

4,872,856

ELECTRICAL CONNECTOR

Denis M. Pooley, Oshawa, and Douglas K. MacKenzie, deceased, late of Markham, both of Canada (by Russell U. MacKenzie, administrator), assignors to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 15, 1989, Ser. No. 323,638
Int. Cl.[4] H01R *11/01*
U.S. Cl. 439—783 **3 Claims**



1. An electrical connector for electrically commoning a pair of conductors, said connector comprising:

a C-member having a pair of spaced apart, conductor-receiving channels and at least one ramp converging towards a space between conductors which may be disposed in said channels; and

a pair of toggle blocks pivotally engaging each other along one side and having a combined width when in a parallel relation to each other which is greater than said space, said blocks adapted for insertion into said space initially at an angle relative to each other to provide a smaller combined width until said blocks engage and slide along said ramp whereupon said blocks are forced into a parallel relation and thereby compress the conductors which may be in said channels.

4,872,857

OPERATION OPTIMIZING SYSTEM FOR A MARINE DRIVE UNIT

Neil A. Newman, Omro; Herbert A. Bankstahl; John M. Griffiths, both of Fond du Lac; Lyle M. Forsgren, Oshkosh, and Wayne T. Beck, Fond du Lac, all of Wis., assignors to Brunswick Corporation, Skokie, Ill.

Filed Aug. 23, 1988, Ser. No. 235,288
Int. Cl.[4] B63H *5/12*
U.S. Cl. 440—1 **18 Claims**

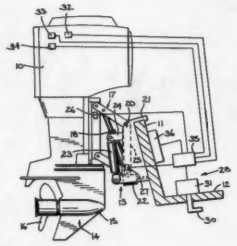
1. A system for optimizing the operation of an engine-driven marine drive unit for a boat comprising:

means for trimming the drive unit relative to the boat;

means for moving the drive unit vertically relative to the boat;

means for sensing the trim position of the drive unit with respect to the boat and for generating an output signal representative of the drive unit trim position;

means for sensing the vertical position of the drive unit with respect to the boat and for generating an output signal representative of the drive unit vertical position; and



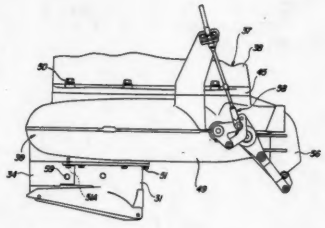
control means operative to receive and store said output signals, said control means being responsive to a selected input signal to cause the trimming means and the moving means to move the drive unit to a position based on stored output signals.

4,872,858

OUTBOARD JET PROPULSION DEVICE

Junichi Hasegawa, and Hideharu Takahashi, both of Hamamatsu, Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Mar. 4, 1988, Ser. No. 164,242
Claims priority, application Japan, Mar. 5, 1987, 62-48717
Int. Cl.[4] B63H *11/08*
U.S. Cl. 440—38 **3 Claims**



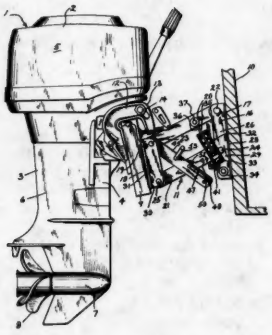
1. A jet propulsion unit for an outboard drive comprising a lower unit housing having a cylindrical portion journaling an impeller shaft for rotation about a vertically extending axis, an impeller contained within a generally cylindrical cavity in said cylindrical portion of said lower unit housing and affixed for rotation with said impeller shaft, an inlet portion depending from said cylindrical portion and defined in part by a foot portion extending forwardly therefrom and terminating in a forward end with said inlet portion extending forwardly of said cylindrical portion, a volute chamber formed above said cylindrical cavity and forming a rearwardly directed water outlet, and means forming a forwardly extending flow diverting member extending upwardly from said foot portion and forwardly from the sides of said cylindrical portion and terminating in proximity to the forward end of said foot portion.

4,872,859

LIFT AND LATCH APPARATUS FOR AN OUTBOARD MOTOR

John M. Griffiths, Fond du Lac; Lyle M. Forsgren, Oshkosh; Neil A. Newman, Omro, and Wayne T. Beck, Fond du Lac, all of Wis., assignors to Brunswick Corporation, Skokie, Ill.

Filed May 11, 1988, Ser. No. 193,114
Int. Cl.[4] B63H *21/26*
U.S. Cl. 440—53 11 Claims



8. In a transom extension assembly for mounting an outboard motor to a boat to provide vertical movement of the motor relative to the transom between raised and lowered positions, said assembly having a collapsible four-leg linkage including a transom bracket leg attached to the transom a motor bracket leg adapted to support the motor, an upper leg pivotally connected at its ends to the upper ends of the transom and motor bracket legs, and a lower leg pivotally connected at its ends to the lower ends of the transom and motor bracket legs, an apparatus for releasably holding the motor in its raised position and supporting the motor in its lower position comprising:

means for applying a lifting force to the linkage to raise the motor in a generally vertical direction;

a latch bar pivotally attached at one end to one of said legs for rotation in opposite directions;

a slot in said latch bar including first and second abutment surfaces at opposite ends of said slot;

stop means on another of said legs, said stop means extending into said slot and movable therein in response to vertical movement of the motor;

said stop means adapted to engage said first abutment surface to hold the motor in its raised position in response to lifting movement of the motor to its raised position, manual rotation of said latch bar in one direction and release of the lifting force;

said stop means adapted to disengage said first abutment surface in response to application of the lifting force and rotation by gravity of said latch bar in the other direction; and,

said stop means adapted to engage said second abutment surface to support the motor in its lowered position in response to release of the lifting force.

4,872,860

SACRIFICIAL ANODE FOR MARINE PROPULSION UNITS

Gary L. Meisenburg, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed May 23, 1988, Ser. No. 197,710
Int. Cl.[4] C23F *13/00*
U.S. Cl. 440—113 16 Claims

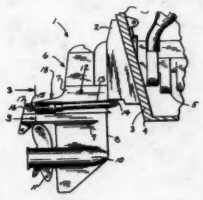
1. In a marine propulsion unit (1) for a boat (4), the combination comprising:

(a) a generally vertical propeller carrying drive housing (6),

(b) a generally horizontal longitudinal fore-to-aft extending trim cylinder unit (12) disposed adjacent said housing for pivotally raising and lowering the latter relative to the water,

(c) a sacrificial anode (19, 47, 55, 61) mounted to said trim cylinder unit,

(d) said trim cylinder unit (12) including:



(1) a trim cylinder (13),

(2) and a piston rod (15) extending from an end of said trim cylinder, said piston rod having an outer end,

(e) and mounting means (16) for attaching said outer end of said piston rod for pivoting said trim cylinder unit relative to said boat,

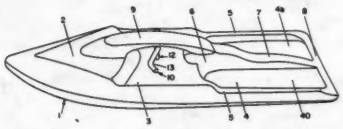
(f) said sacrificial anode being disposed between said trim cylinder end and said mounting means.

4,872,861

GLIDE BOARD WITH RUDDER

Serge Gaudin, 15 Avenue de la République, F-40600 Biscarosse, France, assignor to Serge Gaudin, Biscarosse; Henry Clauzet, Paris and Jean-Pierre Daures, Mont de Marsan, all of, France

Filed Jun. 8, 1988, Ser. No. 203,816
Claims priority, application France, Jun. 10, 1987, 87 08162
Int. Cl.[4] B63H *25/16*
U.S. Cl. 441—79 7 Claims



1. A board with a rudder, said board comprising:

at least one rudder on a lower face of the board mounted for swivelling in the body of the board,

means for actuating said rudder accessible on an upper face of the board,

said means for actuating being disposed substantially in a central zone of the board and comprising two manual members covered by a profiled portion formed so as to allow a user to lie on the board with his chest along said profiled portion,

two substantially parallel elongate housings provided on a rearward, upper-face portion of the board, said housings being formed in the mass of the board for receiving the leg portions of the user below his knees, when kneeling on the board.

4,872,862

METHOD AND APPARATUS FOR MANUFACTURING DISPLAY COMPRISING LIGHT-EMITTING DIODES

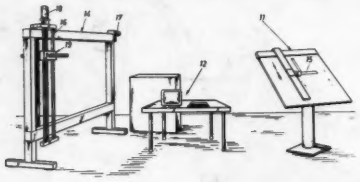
Rolf V. T. Ewald, Cirkelvagen 55, S-310 31 Eldsberga, Sweden

Continuation-in-part of Ser. No. 895,460, Aug. 11, 1986, abandoned, which is a division of Ser. No. 613,091, May 22, 1984, Pat. No. 4,628,422, which is a continuation-in-part of Ser. No. 463,540, Feb. 3, 1983, abandoned. This application Mar. 24, 1988, Ser. No. 173,177

Claims priority, application Sweden, Feb. 16, 1982, 8200913

Int. Cl.[4] B23P *15/00*; B21D *28/32*

U.S. Cl. 445—22 2 Claims



1. An improved method of manufacturing displays incorporating light-emitting diodes, wherein said light-emitting diodes form a selected pattern and their power are enhanced by reflectors surrounding the individual light-emitting diodes, said method comprising

mapping the selected pattern on a substratum,

determining a series of coordinate points on the substratum relating to the positions of the light-emitting diodes to form the selected pattern,

automatically recording the series of coordinates thus determined in computer memory means;

supplying said recorded series of coordinates from said computer memory means to control means and directly utilizing said series of recorded coordinates to successively position backing means and means for forming impressions and openings in said impressions in aligned relationship on opposite sides of a plate;

successively actuating said means for forming impressions and openings as positioned so as to thereby form said impressions and said openings in said plate substantially at each of said series of coordinates;

inserting said diodes in each of said openings; and

interconnecting said diodes in a desired manner.

4,872,863

METHOD OF FIXING A CATHODE-RAY TUBE CONE AND DISPLAY WINDOW PRIOR TO SEALING AND A CATHODE-RAY TUBE MANFACTURED BY SUCH A METHOD

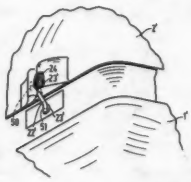
Henricus J. M. Van Der Avoort, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 6, 1988, Ser. No. 202,616

Claims priority, application Netherlands, Jun. 11, 1987, 8901356

Int. Cl.[4] H01J *9/30, 9/26*

U.S. Cl. 445—45 4 Claims



1. A method of manufacturing a cathode-ray tube, including the steps of positioning relative to each other and subsequently sealing to each other a cone part having a substantially rectangular cone edge and a display window part having a substantially rectangular sealing edge at the location of the sealing edge and the cone edge, characterized in that after both parts have been positioned relative to each other this positioning is fixed temporarily prior to sealing by securing locating pins to faces which are provided on the peripheral edge of one of the parts, each locating pin being secured in a slot which is provided on a stud present on the peripheral edge of the other part, each locating pin being secured to a face and in a slot by means of an acrylate adhesive, and also secured to a face and in a slot by means of a temperature resistant cement.

4,872,864

METHOD OF MAKING A CATHODE FROM TUNGSTEN AND ALUMINUM POWDERS

Louis E. Branovich, Howell; Bernard Smith, Ocean; Gerard L. Freeman, Freehold, and Donald W. Eckart, Wall, all of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 23, 1989, Ser. No. 313,837

Int. Cl.[4] H01J *9/04*

U.S. Cl. 445—50 8 Claims

1. Method of making a cathode for operation in microwave devices from tungsten and aluminum powders, said method including the steps of:

(A) mixing the tungsten and aluminum powders,

(B) adding about 2 percent by weight of an activator to the mixture,

(C) ball milling the mixture for about 8 hours,

(D) pressing the ball milled mixture into a billet at about 48,000 p.s.i. in a die,

(E) sintering the billet at about 700° to 1325° C. for about thirty minutes in dry hydrogen of less than −100 dew-point,

(F) backfilling the billet with methyl methacrylate,

(G) machining the billet to the desired geometry,

(H) removing the methyl methacrylate by dissolution in acetone,

(I) thoroughly rinsing in deionized water, methanol and then drying,

(J) firing the billet in dry hydrogen at about 700° to 1325° C. for about 15 minutes,

(K) impregnating the billet with an impregnant having a melting point less than or equal to 1000° C. by firing the billet in a dry hydrogen furnace at a temperature at which the impregnant melts for about two minutes,

(L) removing the billet from the furnace after the furnace is cooled, and

(M) removing any loose pieces of impregnant from the billet.

4,872,865

HYPERTONIC SOLUTION FOR ARTHROSCOPIC SURGERY

Roy D. Bloebaum, Salt Lake City, Utah, and Frank P. Magee, Phoenix, Ariz., assignors to Harrington Arthritis Research Center, Phoenix, Ariz.

Continuation of Ser. No. 785,767, Oct. 9, 1985, abandoned. This application Nov. 30, 1987, Ser. No. 125,731

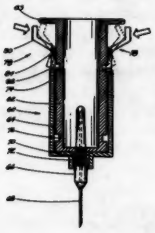
Int. Cl.[4] A61M *1/00*

U.S. Cl. 604—28 9 Claims

1. A composition for use in invasive medical procedures, comprising:

a solution containing ions selected from the group consisting of Na+, K+, Cl− and Ca + + having a hypertonic osmolality between about 350 mmol to about 450 mmol relative to the osmolality of normal mammalian blood

serum and conforming to the ionic composition of normal mammalian synovial fluid so as to be physiologically



compatible with joints and tissues during said medical procedures.

4,872,866

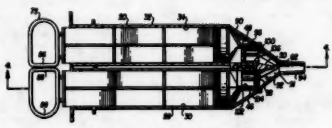
MEDICAL LAVAGE APPARATUS

Richard C. Davis, 14802 Dunstan Place, Tampa, Fla. 33618

Continuation of Ser. No. 95,077, Sep. 11, 1987. This application Dec. 30, 1988, Ser. No. 292,163

Int. Cl.[4] A61M *5/315*

U.S. Cl. 604—227 1 Claim



1. A medical lavage syringe device for irrigating and aspirating a body cavity, said device comprising:

a rigid housing defining an irrigation cylinder with an elongated irrigation bore and an aspiration cylinder with an elongated aspiration bore, said bores being substantially parallel and side-by-side, said irrigation and aspiration cylinder bores each being open and unconnected at first ends thereof, said rigid housing further defining respectively an inlet port and an outlet port in said respective irrigation and aspiration cylinders intermediate first and second ends thereof;

a common tube configuration coupling second ends of said irrigation and aspiration cylinders to a common nozzle;

an irrigation plunger and an aspiration plunger having first ends for respectively fitting into said first open ends of said irrigation and aspiration cylinders and having seals at said first ends thereof for making sealing, sliding contact with internal cylinder surfaces of said respective bores and including hand-engaging portions at second ends outside the cylinders for engaging a hand and thereby being moved into and out of their respective bores by said hand;

a system of check-valves comprising an inlet check-valve located at said inlet port for allowing the flow of fresh irrigation fluid into said inlet port but hindering the flow of fluid from said inlet port, an outlet check-valve located at said outlet port for allowing the flow of aspiration fluid from said outlet port but hindering the flow of fluid into said outlet port, an irrigation check-valve located at said irrigation bore between said inlet port and said common exchange tube for allowing flow of irrigation fluid from said irrigation bore into said common exchange tube but for hindering the flow of fluid from said common exchange tube into said irrigation bore and an aspiration check-valve located at said aspiration bore between said outlet port and said common exchange tube for allowing flow of irrigation fluid from said common exchange tube into said aspiration bore but hindering flow in the opposite direction;

said hand-engaging portions of said irrigation and aspiration plungers having closed, side-by-side, loop configurations, said closed loops being in a common plane and said loops having adjacent sides when are relatively-straight, parallel-to-axes-of-elongation-of-said-bores, said sides positioned close to each other to allow a user to grip both hand engaging portions with fingers of one hand while simultaneously moving the irrigation and aspiration plungers into and out of the irrigation and aspiration cylinders while maintaining these fingers close together.

4,872,867

COMPOSITIONS HAVING ANTITHROMBOGENIC PROPERTIES AND BLOOD CONTACT MEDICAL DEVICES USING THE SAME

Yasushi Joh, Yokohama, Japan, assignor to UBE Industries, Ltd., Ube, Japan

Continuation of Ser. No. 33,157, Jan. 30, 1987, abandoned. This application Feb. 28, 1989, Ser. No. 317,108

Claims priority, application Japan, Jun. 19, 1985, 60-133194; Jun. 19, 1985, 60-133195

Int. Cl.[4] A61M *5/005*

U.S. Cl. 604—269 14 Claims

1. An antithrombogenic material having an interpenetrating polymer network which comprises

(1) a polyether type polyurethane or polyurethane urea containing in its main chain a segment comprising polytetramethylene oxide;

(2) a water soluble polymer, a water swellable polymer or a combination thereof; and

(3) a room temerpature cross-linking type silane coupling agent capable of being activated by water and induced condensation polymerization with crosslinking which is crosslinked to form a hydrophobic highly crosslinked polysiloxane network in which network the polyether type polyurethane or polyurethane urea, and the water soluble polymer, the water swellable polymer or combination thereof, are entangled.

4,872,868

COLLECTING BAG FOR MAKING QUICK MEDICAL ANALYSES

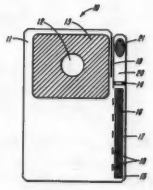
Francois Chevallier, 10 boulevard Périer, 13008 Marseille, France

Continuation of Ser. No. 140, Jan. 2, 1987, abandoned. This application Sep. 28, 1988, Ser. No. 252,036

Claims priority, application France, Jan. 3, 1986, 86 00033

Int. Cl.[4] A61M *1/00*

U.S. Cl. 604—327 10 Claims



1. A collection bag for performing quick medical analysis allowing the making of a diagnosis or the monitoring of the evolution of the state of health of a patient comprising,

a collection chamber defined by a closed, flexible envelope,

a first orifice for allowing for passage into the collection chamber of matter such as stools, urine, secretions or other material originating from the patient,

a second chamber defined by a weld point of the walls of the bag along at least one edge of the bag, the second chamber in fluid communication with the collection chamber, and

a second orifice constructed and arranged both to allow insertion of a product or an instrument into the second chamber and to allow for sampling the contents of the bag, the second orifice comprising a slit for access inside the bag, the slit constituting the inlet of the second chamber.

4,872,869

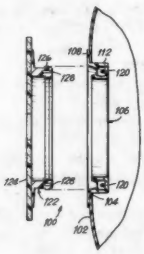
LOW PROFILE OSTOMY DEVICE

Owen L. Johns, Madeira Beach, Fla., assignor to Smith & Nephew (Latin America), Inc., Largo, Fla.

Continuation of Ser. No. 872,305, Jun. 9, 1982, abandoned. This application Jun. 24, 1988, Ser. No. 210,910

Int. Cl.[4] A61F *5/44*

U.S. Cl. 604—342 **9 Claims**



1. A low profile ostomy device which comprises:

(a) an ostomy bag provided with a stoma-encircling opening through the side thereof;

(b) a first coupling member comprising a flat ring portion attached to the ostomy bag through the opening and having an aperture substantially of the same size as and coincident with the ostomy bag opening, said ring having a first engaging element in the form of an annular channel having two sides and a bottom, the bottom of the channel having a rib extending upward within the channel; said first engaging means extending into the ostomy bag; and

(c) a second coupling member comprising means for attachment to a user,s body, said second member having a second engaging element for engagement with the first engaging element, said second member having an aperture of substantially the same size as the ostomy bag opening, said second engaging element comprising an annular flange having a central groove therein which mates with said rib to provide a seal between the first and second engaging means.

4,872,870

FUSED LAMINATED FABRIC AND PANTY LINER INCLUDING SAME

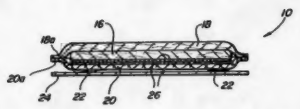
Lauren Jackson, Yardley, Pa., assignor to Chicopee, New Brunswick, N.J.

Continuation of Ser. No. 72,837, Jul. 13, 1987, abandoned, which is a division of Ser. No. 644,159, Aug. 16, 1984, Pat. No. 4,737,404. This application Oct. 19, 1988, Ser. No. 262,111

Int. Cl.[4] A61F *13/00*

U.S. Cl. 604—366 **11 Claims**

1. A panty liner to be worn in the crotch portion of an undergarment comprising: a first fibrous layer having first and second oppositely facing major surfaces, said first major surface of said first fibrous layer being adapted to be disposed against the body; an absorbent core smaller in external dimensions than said first fibrous layer and positioned in juxtaposed relationship with respect to the second major surface thereof; liquid repellent means generally coextensive in external dimension with the external dimensions of said absorbent core and positioned in juxtaposed relationship with respect thereto; and a second fibrous layer of base fibers and fusible fibers, said layer having substantially the same size and shape as said first fibrous layer, said second fibrous layer having first and second oppositely facing major surfaces, the first major surface of said second fibrous layer being positioned in face-to-face juxtaposition with said liquid repellent means and with the peripheral portion of the second major surface of said first fibrous layer outwardly of said liquid repellent means, the fibers in said



second fibrous layer being arranged in a regular repeating pattern of entangled region of higher density than the average density of the layer and interconnected fibers extending between the entangled fiber regions, said interconnecting fibers being randomly entangled with each other in said entangled regions, said heat fusible fibers being present at least at the first major surface of said second fibrous layer, at least some of said heat fusible fibers in the peripheral portion of said second fibrous layer being fused to fibers in the peripheral portion of said first fibrous layer, whereby said first and second fibrous layers are secured to one another and said absorbent core and said liquid repellent means are retained therebetween.

4,872,871

DISPOSABLE ABSORBENT GARMENT HAVING ELASTIC OUTER COVER AND INTEGRATED ABSORBENT INSERT STRUCTURE

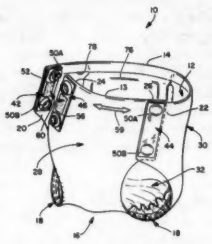
Deborah L. Proxmire, Larsen; Dan D. Endres, Appleton; John C. Wilson, Neenah; Lynn A. Johnson, DePere; Georgia L. Zehner, Larsen; Leona G. Boland, Neenah, and Robert A. Stevens, Appleton, all of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Continuation of Ser. No. 947,941, Dec. 31, 1986, abandoned. This application Jul. 14, 1988, Ser. No. 220,356

The portion of the term of this patent subsequent to Oct. 20, 2004, has been disclaimed.

Int. Cl.[4] A61F *13/16*

U.S. Cl. 604—394 **52 Claims**



1. An anatomically form-fitting, generally self-adjusting disposable absorbent garment comprising:

a breathable elastomeric nonwoven outer cover, including a pair of leg openings, front and rear waist sections together defining a waist opening, a crotch section situated between said leg openings and opposed front and rear panels separated by said crotch section;

an absorbent insert structure having opposed longitudinal

ends and substantially superposable on said front and rear panels and said crotch section, including a liquid impermeable barrier and a liquid permeable bodyside liner with an absorbent composite disposed therebetween;

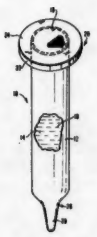
attachment means for attaching and integrating said longitudinal ends of said insert to said outer cover, at selected front and rear waist attachment zones, defining one or more free-span zones underlying said insert wherein the functional stretchability of said outer cover in said free-span zone is substantially unrestricted.

4,872,872

MEDICAMENT CONTAINER/DISPENSER ASSEMBLY

Robert B. Polak, 160 Kimberly Ave., Asheville, N.C. 28804

Filed Sep. 22, 1986, Ser. No. 910,407
Int. Cl.[4] A61M 5/14
U.S. Cl. 604—405 13 Claims



1. A disposable container/dispenser assembly for the extended storage and direct intravenous administration of a medicament comprising;

a substantially non-collapsible main body defining a chamber for containing said medicament in liquid form, said main body being prepared from a medical grade polypropylene-containing molding resin and having an upper portion and a lower portion;

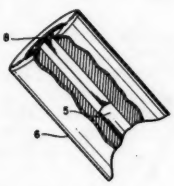
pressure equalizing means consisting essentially of a liquid impervious, gas permeable membrane prepared from a material selected from the group consisting of polypropylene, nylon, and polysulfone, said membrane permanently attached to the upper portion of said main body; and an exit port consisting of a tube extending from the lower portion of said main body and having a rupturable closed end.

4,872,873

CONTROLLED RELEASE BOLUS DEVICE

Joel R. Zingerman, Westfield, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Filed Dec. 14, 1987, Ser. No. 133,586
Int. Cl.[4] A61K 9/22
U.S. Cl. 604—892.1 3 Claims



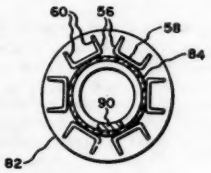
1. An improved controlled release bolus comprising a semipermeable membrane defining a compartment, the compartment being divided into first and second portions by a moveable interface, the first compartment portion containing a swellable agent, the second compartment portion containing a medicament to be dispensed, a densifier within the second compartment adjacent said membrane and a passageway through the membrane and densifier connecting said second compartment portion with the exterior of the bolus, having a central axis and a diameter such that when the bolus is in contact with water, the semipermeable membrane allow water to pass therethrough which is imbibed by the swellable agent which forces the interface to move the medicament to be dispensed through the passageway, wherein the improvement comprises an insert of rigid film having a central axis which is placed coaxially within the passageway, said inset comprising from 2 to 6 arm members connected together at and extending radially form said central axis of said insert a distance of approximately one-half of the diameter of the passageway.

4,872,874

METHOD AND APPARATUS FOR TRANSARTERIAL AORTIC GRAFT INSERTION AND IMPLANTATION

Syde A. Taheri, 268 Dan Troy, Williamsville, N.Y. 14221

Filed May 29, 1987, Ser. No. 56,131
Int. Cl.[4] A61F 2/06; A61B 17/04
U.S. Cl. 623—1 4 Claims



1. The method of attaching an implantable tubular graft to the wall of a blood vessel, comprising the steps of:

forming an incision in said blood vessel;

inserting said tubular graft into said blood vessel through said incision;

moving said graft along said blood vessel to a desired location relative to said blood vessel;

moving an inflatable bulb in a deflated condition within said graft so as to be in a desired position with respect to said graft and blood vessel, said bulb releasably carrying a plurality of clips having outwardly-facing ends;

quickly inflating said bulb so as to drive said clips outwardly to penetrate said graft and blood vessel;

releasing said clips after said clips have penetrated said graft and blood vessel;

deflating said bulb;

withdrawing such deflated bulb from said blood vessel; and closing said incision,

thereby to leave said graft attached to said blood vessel by said clips.

4,872,875

PROSTHETIC HEART VALVE

Ned H. C. Hwang, Houston, Tex., assignor to Carbon Implants, Inc., Austin, Tex.

Filed Jan. 28, 1989, Ser. No. 296,428
Int. Cl.[4] A61F 2/24
U.S. Cl. 623—2 14 Claims

1. A prosthetic heart valve for allowing blood flow therethrough in a downstream direction, which valve comprises

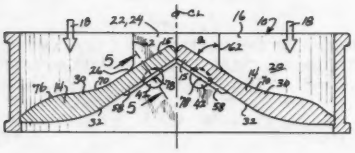
a generally annular valve body having an interior surface defining a central passageway through which blood flows,

a pair of occluders proportioned to be pivotally received within said valve body and to move between an open position wherein downstream flow of blood is permitted

and a closed position wherein the reverse flow of blood in an inflow direction is blocked, said occluders each having a pair of opposite lateral edges respectively extending between a minor mating edge and a major arcuate edge and having major inflow and outflow surfaces,

cooperative pivotal mounting means incorporated in said occluders in the regions of each lateral edge and in said valve body in its interior surface region which cooperate to establish generally pivotal movement of said occluders about a pair of parallel pivot axes,

said occluders each having an inflow surface formed with a concave region of two-dimensional curvature and with a generally convex region of two-dimensional curvature,



said concave surface region being spaced downstream from said pivot axis in said open position and being curved about a straight line which is generally parallel to said pivot axis, said convex region being spaced further from said pivot axis than said concave region, and

said occluders being installed in said annular valve body and constructed so that said occluders have an angle of opening of about 70° to about 85° in said fully open position with said outflow surface regions lying generally adjacent the centerline through said central passageway, and so that, in the closed position, said mating edges of said occluders generally abut each other and said arcuate edges of said occluders abut said valve body interior surface.

4,872,876

UNIVERSAL FIT INTRAOCULAR LENS

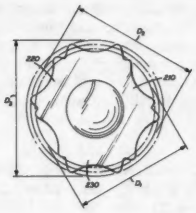
John M. Smith, Santa Barbara, Calif., assignor to Nestle S.A., Vevey, Switzerland

Filed May 11, 1988, Ser. No. 192,824
Int. Cl.[4] A61F *2/16*
U.S. Cl. 623—6 **9 Claims**

1. An intraocular lens for use in eyes of different sizes, comprising:

an optic;

a haptic which is connected to and projects outwardly from at least a portion of the optic; the haptic including an outer periphery with a plurality of support portions adapted to maintain and support the optic within an eye, the support portions being located on one of a plurality of different diameters of different length relative to the optic, so that the support portions along one diameter can be selected



and the other support portions removed for adapting the lens to fit in an eye of a predetermined size.

4,872,877

INTRAOCULAR LENS WITH ULTRAVIOLET SCREENING AGENT

John Tiffany, Ventura, Calif., assignor to Dennis T. Grendahl, Shorewood, Minn.

Filed Mar. 17, 1987, Ser. No. 26,631
Int. Cl.[4] A61F *2/16*
U.S. Cl. 623—6 **6 Claims**

1. A method for incorporating an ultraviolet screening agent into a preformed flexible silicone rubber intraocular lens, the method comprising:

a. preparing a solution of an ultraviolet screening agent in an organic liquid, the concentration of agent in the solution being such that the solution has a higher concentration of agent than the lens material;

b. bringing the lens and the solution into contact with each other until the lens and solution reach osmotic equilibrium;

c. separating the lens and the solution; and,

d. drying the lens.

4,872,878

OPTICAL BRIGTHENER IN AN INTRAOCULAR LENS

John S. Tiffany, Ventura, Calif., assignor to Dennis T. Grendahl, Shorewood, Minn.

Continuation-in-part of Ser. No. 26,631, Mar. 17, 1987. This application May 26, 1987, Ser. No. 53,840
Int. Cl.[4] A61F *2/16*
U.S. Cl. 623—6 **3 Claims**

1. A method for incorporating an ultraviolet screening agent and an optical brightener into a preformed silicone rubber intraocular lens, the method comprising:

a. preparing a solution of an ultraviolet screening agent and an optical brightener in an organic liquid, the concentration of each in the solution being such that the solution has a higher osmotic pressure than the lens material;

b. bringing the lens and the solution into contact with each other until the lens and solution reach osmotic equilibrium;

c. separating the lens and the solution; and,

d. drying the lens.

4,872,879

PROSTHETIC DEVICE FOR ABOVE-KNEE AMPUTATION

Daniel L. Shamp, Akron, Ohio, assignor to Prosthetic Consultants Inc., Akron, Ohio

Filed Sep. 22, 1987, Ser. No. 99,778
Int. Cl.[4] A61F 2/80
U.S. Cl. 623—36 9 Claims

1. A prosthetic socket for above-knee amputations comprising:

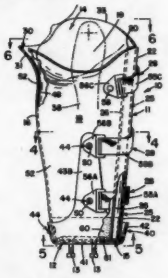
an interface having proximal and distal ends, said proximal and distal ends both being open;

a single peripheral discontinuity;

said peripheral discontinuity extending along the entire longitudinal extent of said interface between said proximal and distal ends to permit adjustment of the peripheral dimension of said interface along the full longitudinal extent thereof;

means selectively to secure the selectively adjusted peripheral dimension of said interface so that it will properly circumscribe a residual limb received within said interface;

a frame positioned at the distal end of said interface; wherein said frame incorporates a cup-like portion to receive the distal end of said interface:



mounting tangs extend upwardly from said cup-like portion; and

said means selectively to secure said frame to the distal end of said interface are connected through said tangs.

4,872,880

PROCESS FOR THE DYEING OF POLYMERS OF PROPYLENE, BUTENE-1 AND 4-METHYL-PENTENE-1 USING BASIC DYE IN AN AQUEOUS DYE BATH

John R. B. Boocock, Kingston, Canada, assignor to DuPont Canada Inc., Mississauga, Canada

Continuation-in-part of Ser. No. 126,796, Dec. 1, 1987, abandoned. This application Oct. 6, 1988, Ser. No. 253,632

Claims priority, application United Kingdom, Dec. 1, 1986, 8628658

Int. Cl.[4] C08L *23/02;* D06P *1/41, 3/79*

U.S. Cl. 8—513 7 Claims

1. A process for dyeing a polyolefin article, comprising the steps of:

(A) contacting the polyolefin article with an aqueous dyebath, said polyolefin being a blend comprising (i) 50–99 parts by weight of at least one polymer selected from the group consisting of homopolymers of propylene, butene-1 or 4-methyl-pentene-1 and copolymers of propylene, butene-1 or 4-methyl-pentene-1 with a minor amount of a hydrocarbon alpha-olefin, and mixtures thereof, and (ii) 1–50 parts by weight of a copolymer selected from the group consisting of direct copolymers or graft copolymers wherein (a) said direct copolymer is a zinc ionomer of a copolymer of an alpha-olefin having the formula R—CH=CH_2, where R is a radical selected from the class consisting of hydrogen and alkyl radicals having from 1 to 8 carbon atoms, with at least one alpha-beta-ethylenically unsaturated carboxylic acid having from 3 to 8 carbon atoms, the acid moieties being randomly or non-randomly distributed in the polymer chain, the carboxylic acid content being 0.5–50% by weight of the direct copolymer, any other copolymerized monomer being monoethylenically unsaturated, and (b) said graft copolymer is obtained by grafting 0.1 to 20 percent by weight of at least one alpha,beta-unsaturated carboxylic acid having 3 to 8 carbon atoms or unsaturated carboxylic acid anhydride onto a preformed polyolefin backbone derived from at least one of homopolymers of C_2 to C_8 hydrocarbon alpha-olefins, copolymers of ethylene and at least one C_3 to C_8 hydrocarbon alpha-olefin and copolymers of ethylene and unsaturated carboxylic acids, in which polyolefin backbone any other optionally copolymerized monomer component is monoethylenically unsaturated, said aqueous dyebath containing basic dye in a concentration of at least 0.4 g/l and at a pH of at least 5.0, the temperature of the aqueous dyebath being at least 90° C.,

(B) maintaining said polyolefin article in contact with the aqueous dyebath for a period of at least 10 minutes, and

(C) removing the polyolefin article so dyed from the aqueous dyebath.

4,872,881

MIXTURES OF WATER-SOLUBLE RED AND YELLOW OR BLUE REACTIVE DYES AND A METHOD OF DYEING CELLULOSIC FIBERS USING SUCH DYE MIXTURES

Takashi Fujita; Toshio Hihara, both of Kitakyushu; Yoshio Kogure, Takarazuka; Riyouichi Sekioka, and Noboru Nakamura, both of Kitakyushu, all of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

PCT No. PCT/JP88/00226, § 371 Date Oct. 31, 1988, § 102(e) Date Oct. 31, 1988, PCT Pub. No. WO89/00184, PCT Pub. Date Jan. 12, 1989

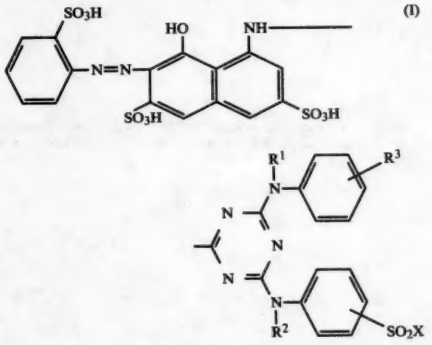
PCT Filed Mar. 1, 1988, Ser. No. 269,146

Claims priority, application Japan, Jun. 30, 1987, 62-163166

Int. Cl.[4] C09B *62/00, 67/22;* D06P *1/38*

U.S. Cl. 8—549 38 Claims

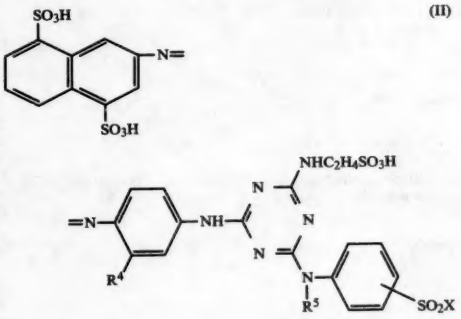
1. A water-soluble reactive dye mixture, wherein a yellow and/or blue water-soluble reactive dye is blended with at least one kind of red water-soluble reactive dyes represented by the following general formula (I) in the form of free acid:



(I)

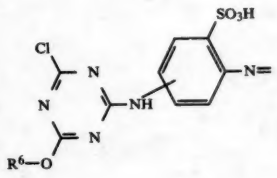
(where: each of R^1 and R^2 denotes a hydrogen atom or a lower alkyl group which may contain therein a substituent; R^3 indicates a hydrogen atom, a lower alkyl group or a halogen atom and X represents —CH=CH_2 or —$C_2H_4OSO_3H$),

said water-soluble reactive dye mixture being characterized in that the yellow component is a water-soluble reactive dye represented by the following general formula (II) in the form of free acid:



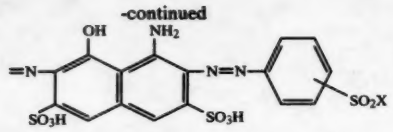
(II)

(where: R^4 represents a —$NHCOCH_3$ group, a —$NHCOC_2H_5$ group, a —$NHCONH_2$ group or a —$NHCOSO_2CH_3$ group; R^5 denotes a hydrogen atom or a lower alkyl group which may contain therein a substituent; and X has the same definition as in the preceding general formula (I)), and the blue component is at least one water-soluble reactive dye represented by the following general formulas (III) to (VI) in the form of free acid:

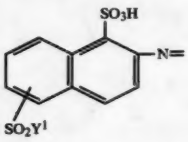


(III)

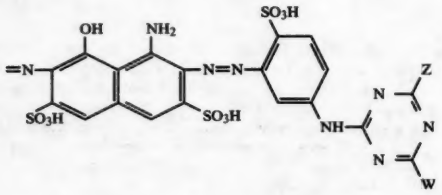
-continued



(where: R^6 indicates a lower alkyl group; and X has the same definition in the preceding general formula (I));

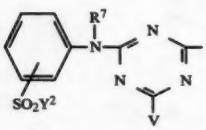


(IV)

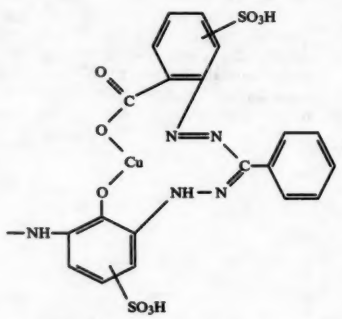


(where: Y^1 denotes a $-CH=CH_2$ group, a $-C_2H_4OSO_3H$ group or a —OH group; Z represents a chlorine atom or a fluorine atom; W designates a lower alkoxy group or a

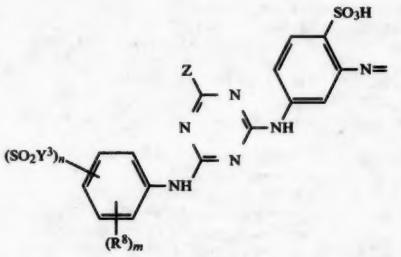
and X has the same definition as in the preceding general formula (I);



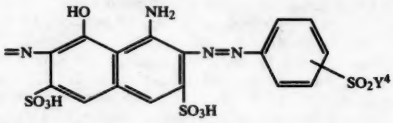
(V)



(where: V denotes a chlorine atom, a fluorine atom or a $-NHC_2H_4SO_3H$ group; R^7 represents a hydrogen atom or a lower alkyl group which may contain therein a substituent; and Y^2 indicates a $-CH=CH_2$ group, a $-C_2H_4OSO_3H$ group or a —OH group, provided that when V is a $-NHC_2H_4SO_3H$ group, Y^2 is either a $-CH=CH_2$ group or a $-C_2H_4OSO_3H$ group; and



(VI)



(where: R^8 denotes a chlorine atom, a —COOH group or a —OH group; each of Y^3 and Y^4 represents a $-CH=CH_2$ group, a $-C_2H_2OSO_3$ group or a —OH group; m and n are numbers of 0 or 1, but cannot be 0 at the same time; and Z has the same definition as in the preceding general formula (IV)).

4,872,882

DYEING FORMULATIONS OF MIXTURES OF RED DISPERSE DYES FOR THE WASHFAST DYEING OF POLYESTER FIBERS OR MIXTURES THEREOF WITH CELLULOSE FIBERS: BENZO-DI-FURANONE AND AZO DYES

Manfred Hähnke, Kelkheim, and Reinhard Kühn, Frankfurt am Main, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

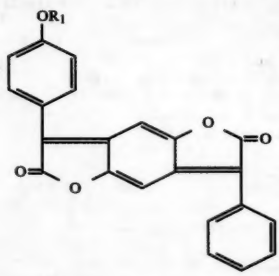
Filed Sep. 1, 1988, Ser. No. 239,520

Claims priority, application Fed. Rep. of Germany, Sep. 2, 1987, 3729323; Oct. 3, 1987, 3733505

Int. Cl.[4] C09B *23/08, 67/22;* **D06P** *3/54*

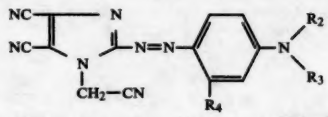
U.S. Cl. 8—638 **5 Claims**

1. Dyeing formulations in solid of liquid form, containing one or more red disperse dyes of the general formula (1)



(I)

where R_1 denotes an alkyl group of 1 to 4 carbon atoms, and one or more red disperse dyes of the general formula (2)



(2)

where R_2 denotes the group ethyl, n-propyl, n-butyl, —CH-2—CH_2—CH_2—$COOCH_3$ or —CH_2—CH_2—CH-2—$COOC_2H_5$, R_3 denotes an ethyl, n-propyl or n-butyl group, and R_4 denotes a hydrogen, chlorine, or bromine atom or a methyl group, one or more anion-active or nonionic dispersing agents and optionally water, wherein, based on the mixing ratio of the pure dyes to one another, the dyes of the formula (1) are present in a proportion of 15 to 85 percent by weight and the dyes of the formula (2) in a proportion of 85 to 15 percent by weight, and wherein the dyes have been brought into a state of extremely fine division by conjoint of separate wet grinding in the presence of a dispersing agent.

4,872,883

MIXTURES OF MONOAZO DYESTUFFS

Ulrich Bühler, Alzenau; Klaus Hofmann, Frankfurt am Main, and Manfred Hähnke, Kelkheim, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

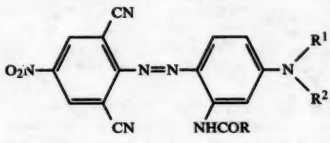
Filed Jan. 27, 1988, Ser. No. 149,010

Claims priority, application Fed. Rep. of Germany, Feb. 2, 1987, 3702967

Int. Cl.[4] C09B *67/22, 29/08;* D06P *1/18*

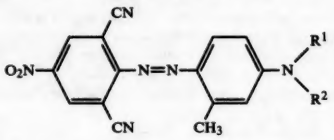
U.S. Cl. 8—639 **20 Claims**

1. A mixture of monoazo dyestuffs which comprises one or more dyestuffs of the formula I



(I)

and one or more dyestuffs of the formula II



(II)

wherein R^1 and R^2 independently of one another each denote linear or branched alkyl with 1 to 6 carbon atoms and R denotes linear or branched alkyl with 1 to 3 carbon atoms.

4,872,884

REDUCED CALORIE CHEWING GUM BASE AND COMPOSITIONS CONTAINING THE SAME

Subraman R. Cherukuri, Towaco, N.J., and Gul Mansukhani, Staten Island, N.Y., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Dec. 10, 1986, Ser. No. 939,918

Int. Cl.[4] A23G *3/30*

U.S. Cl. 426—3 **34 Claims**

1. A chewing gum base composition consisting essentially of, in weight percent:

(a) about 0.5 to about 20% elastomer; about 10% to about 25% of a polyvinyl acetate having a medium molecular weight of about 35,000 to about 55,000; about 4.5% to about 10.0% acetylated monoglyceride; and about 6% to about 10% of a wax having a melting point below about 60° C.; and

(b) remaining amounts of a material selected from the group consisting of elastomer solvent, emulsifiers, plasticizers, fillers and mixtures thereof.

4,872,885

DISPERSANT FOR AQUEOUS SLURRY OF CARBONACEOUS SOLID AND AQUEOUS CARBONACEOUS SOLID SLURRY COMPOSITION INCORPORATING SAID DISPERSANT THEREIN

Tsuneo Tsubakimoto, Toyonaka; Hayami Ito, Himeji; Shuhei Tatsumi, Akashi; Yoshihiro Kajibata, Hyogo; Shoichi Takao, Akashi; Takakiyo Goto, Yokohama; Akio Nakaishi, Yokosuka; Kenji Rakutani, Yokohama; Toshio Tamura, Yokohama, and Hiroya Kobayashi, Minoo, all of Japan, assignors to Kawasaki Jukogyo Kagushiki Kaisha, Hyogo and Nippon Shokubai Kabaku Kogyo Co., Ltd., Osaka, both of, Japan

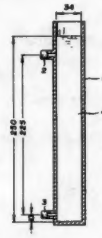
PCT No. PCT/JP87/00109, § 371 Date Feb. 23, 1988, § 102(e) Date Feb. 23, 1988

PCT Filed Feb. 20, 1987, Ser. No. 171,866

Claims priority, application Japan, Feb. 27, 1986, 61-150939; Aug. 19, 1986, 61-192055; Aug. 27, 1986, 61-199069; Aug. 27, 1986, 61-199070; Dec. 19, 1986, 61-305031; Dec. 19, 1986, 61-305032; Dec. 19, 1986, 61-305033; Dec. 19, 1986, 61-305034

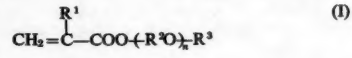
Int. Cl.[4] C10L *1/32*

U.S. Cl. 44—51 **26 Claims**



1. A dispersant for an aqueous carbonaceous solid slurry, comprising a water-soluble copolymer having an average molecular weight of 1,000 to 500,000 and obtained by polymerizing the following monomer components (A), (B), (C), and (D) and/or a water-soluble copolymer obtained by neutralizing said copolymer with a basic substance:

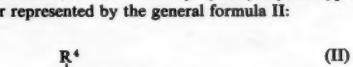
(A) 0.1 to 7 mol % of a polyalkylene glycol mono(-meth)acrylate type monomer represented by the general formula I:



(I)

wherein R^1 stands for hydrogen atom or methyl group, R^2 for alkylene group having 2 to 4 carbon atoms, n for a numeral in the range of 1 to 100 on the average, and R^3 for an alkyl, alkenyl, or aryl group having 1 to 30 carbon atoms, an alkyl, cyclic alkyl, or cyclic alkenyl group possessing an aryl group as a substituent, or a monovalent organic group derived from a heterocyclic compound,

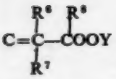
(B) 5 to 94.9 mol % of a sulfoalkyl (meth)acrylate type monomer represented by the general formula II:



(II)

wherein R^4 stands for hydrogen atom or methyl group, R^5 for an alkylene group having 1 to 4 carbon atoms and X for hydrogen atom, an alkali metal atom, an alkaline earth metal atom, an ammonium group, or an amine base,

(C) 5 to 94.9 mol % of an unsaturated carboxylic acid type monomer represented by the general formula III:



(III)

wherein R^6 and R^7 independently stand for hydrogen atom, methyl group, or —COOY, providing that R^6 and R^7 do not simultaneously stand for —COOY, R^8 stands for hydrogen atom, methyl group, —COOY, or —CH_2COOY, providing that R^6 and R^7 independently stand for hydrogen atom or methyl group where R^8 stands for —COOY or —CH_2COOY, and Y stands for hydrogen atom, alkali, metal atom, alkaline earth metal atom, ammonium group, or amine base, and

(D) 0 to 20 mol % of other monomer providing that the total amount of said monomer component (A), (B), (C), and (D) is 100 mol %.

4,872,886

TWO-STAGE COAL GASIFICATION PROCESS

John P. Henley; Stanley R. Pearson, both of Baton Rouge, La.; Bruce C. Peters, Midland, Mich., and Larry L. LaFitte, Baton Rouge, La., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 803,031, Nov. 29, 1985, abandoned. This application Apr. 5, 1988, Ser. No. 178,035

Int. Cl.[4] C10J *3/46*

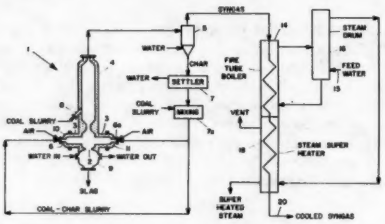
U.S. Cl. 48—197 R **10 Claims**

1. A non-catalytic two-stage upflow process for gasification of a carbonaceous material, which process comprises the steps of

(a) combusting in a fired horizontal slagging reactor a stream comprising an oxygen-containing gas and a first increment of a slurry of particulate carbonaceous material in a liquid carrier at a temperature of between 2400° F. (1316° C.) and 3000° F. (1649° C.) and at a pressure of from 50 psig (345 kPa gage) to 600 psig (4137 kPa gage) by means of opposed horizontal burner nozzles, thereby evolving heat and forming a liquid, molten slag and a gaseous products stream and entrained byproduct sticky, molten slag particles;

(b) separating said liquid, molten slag;

(c) contacting, in an unfired vertical second stage, said gaseous products stream and said entrained byproduct sticky, molten slag particles from the fired horizontal reactor with a second increment of a slurry of particulate carbonaceous material in a liquid carrier at a temperature of between 1600° F. (871° C.) and 2000° F. (1093° C.), whereby a substantial portion of the heat evolved in the said step (a) is recovered by converting the second increment of carbonaceous material and carrier liquid into steam, vapor from



the carrier liquid, synthesis gas and char, whereby at least a portion of the entrained byproduct sticky, molten slag particles are cooled below the temperature of adherence to heat transfer surfaces and at least a portion of said entrained sticky, molten slag particles are absorbed onto said char preventing the fouling of the downstream heat recovery equipment; and

(d) recovering another portion of the heat values from said gaseous combustion products in a high temperature heat recovery system, including a fire-tube boiler, whereby the gaseous combustion products are cooled to a temperature of about 450° to about 550° F. (232° to 288.7° C.).

4,872,887

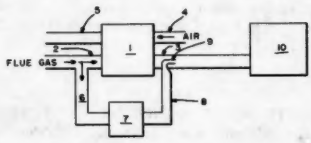
METHOD FOR FLUE GAS CONDITIONING WITH THE DECOMPOSITION PRODUCTS OF AMMONIUM SULFATE OR AMMONIUM BISULFATE

Ralph F. Altman, Chattanooga, Tenn.; John P. Gooch; Edward B. Dismukes, both of Birmingham, Ala., and Edward C. Landham, Jr., Pinson, Ala., assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Sep. 12, 1988, Ser. No. 243,435

Int. Cl.[4] B03C *1/00*

U.S. Cl. 55—5 **12 Claims**



1. A method for conditioning flue gas containing suspended fly ash, comprising the steps of:

(a) diverting a slipstream of flue gas from a main flue gas stream at a point upstream from an air preheater located directly upstream of an electrostatic precipitator where the temperature of said main flue gas stream is in the range of about 700° F. to 900° F., said diverted stream thereby having a temperature in the range of from about 700° F. to 900° F.;

(b) introducing an aqueous solution of ammonium sulfate or ammonium bisulfate into said diverted flue gas slipstream thereby effecting thermal decomposition of said ammonium sulfate or bisulfate into its gaseous thermal decomposition products which include sulfur trioxide and ammonia;

(c) flowing said gaseous thermal decomposition products through a catalyst capable of oxidizing NH_3 with O_2 to produce N_2 and H_2O and suppressing the reaction whereby NH_3 and SO_3 interact by an oxidation-reduction process to produce N_2, SO_2 and H_2O;

(d) then returning said diverted flue gas slipstream to said main flue gas stream at a point between said air preheater and said electrostatic precipitator thereby distributing said gaseous thermal decomposition products into said main flue gas stream flowing between said air preheater and said electrostatic precipitator.

4,872,888

MICROPOROUS MEMBRANE FILTER AND METHOD OF PRODUCING SAME

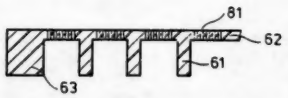
Wolfgang Ehrfeld, Karlsruhe; Peter Hagmann, Eggenstein-Leopoldshagen; Jürgen Mohr, Sulzfeld, and Dietrich Münchmeyer, Stutensee, all of Fed. Rep. of Germany, assignors to Kernforschungszentrum Karlsruhe GmbH, Karlsruhe, Fed. Rep. of Germany

Filed Feb. 11, 1988, Ser. No. 154,298

Claims priority, application Fed. Rep. of Germany, Feb. 13, 1987, 3704546

Int. Cl.[4] B01D *39/16, 59/14;* **C08J** *9/26;* **B29C** *67/20*

U.S. Cl. 55—16 **9 Claims**



1. A microporous membrane filter comprising: an integrally molded body of a material whose solubility can be changed by

high energy radiation and including a first flat membrane portion and a plurality of supporting elements for said membrane portion extending from one surface of said membrane portion; and a plurality of micropores provided in selected regions of said membrane portion and formed by high energy irradiation of the membrane and removal of the regions of increased solubility.

4,872,889

FILTER SYSTEM FOR THE REMOVAL OF ENGINE EMISSION PARTICULATES

Gerhard Lepperhoff, Eschweiler, and Georg Hüthwohl, Aachen, both of Fed. Rep. of Germany, assignors to FEV Motorentechnik GmbH & Co., KG, Aachen, Fed. Rep. of Germany

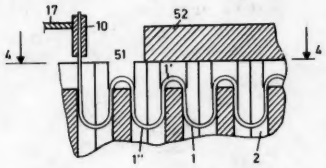
Filed Apr. 8, 1988, Ser. No. 179,647

Claims priority, application Fed. Rep. of Germany, Apr. 11, 1987, 3712333

Int. Cl.[4] B01D *46/00*

U.S. Cl. 55—267 **14 Claims**

1. A filter system for removing particulates from exhaust gases of an internal combustion engine, in particular a diesel engine, comprising at least one filter member in the configuration of a honeycomb of a porous filter material having generally parallel inlet and outlet passages for the gases, particulates for the gases being trapped on some of the surfaces of said inlet passages, said outlet passages being plugged closed at the gas intake side of said filter member, said inlet passages having inlet openings facing said gas intake side and being plugged closed at a side opposite said gas intake side, electric resistance heating means comprising a plurality of spaced apart heating elements each having loop-shaped wire portions extending into several of said inlet openings at said gas intake side for heating and igniting the trapped particulates, said filter member having a plurality of spaced apart grooves in said gas intake side wall



thereof receiving connecting portions of said looped shaped wire portions said heating elements for firmly positioning said heating elements directly in said filter member.

4,872,890

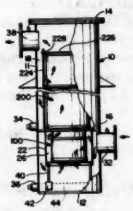
MULTI-STAGE GAS-ENTRAINED LIQUID SEPARATOR

Ned L. Lamprecht, Rocky River, Ohio, and Clyde W. Hawley, Chester, Va., assignors to Dollinger Corporation, Richmond, Va.

Filed Nov. 14, 1988, Ser. No. 270,022

Int. Cl.[4] B01D *46/02*

U.S. Cl. 55—323 **1 Claim**



1. A multi-stage gas-entrained liquid separator comprising:

housing means having a first chamber and a second chamber separated by a partition and communicable with one another through a first aperture in said partition, said first chamber having an annular passage provided with a tangential gas inlet for admitting an inlet gas-liquid stream in a tangential path thereinto and for imparting centrifugal action upon large liquid droplets entrained in said admitted gas-liquid stream to cause impingement of said entrained large liquid droplets against said housing means, said annular passage opening into said first chamber, said first chamber further being provided with an inner chamber separated from said annular passage and communicable therewith by a second aperture so positioned relative said gas inlet and said annular passage as to impart a change of direction to said admitted gas-liquid stream, said inner chamber also communicating with said first aperture, said second chamber having a gas outlet for discharging a gas stream therefrom, said fisrt chamber, second chamber and inner chambers each having a respective liquid sump at a lower portion thereof;

drain means for draining the respective liquid sumps of the first and second chambers;

means for draining the liquid sump of the inner chamber into the liquid sump of the first chamber;

preseparator means provided in said inner chamber for separating by impingement thereon liquid droplets from said gas-liquid stream and for coalescing and draining said separated liquid into said inner sump, and for conducting said gas-liquid stream through said first aperture into said second chamber; and

two-stage principal separator means provided in said second housing for separating by impingement and coalescence thereon liquid microdroplets entrained in said gas-liquid stream admitted thereto from said preseparator means and for preventing by impingement re-entrainment of coalesced liquid droplets therefrom into a gas stream discharged therefrom.

4,872,891

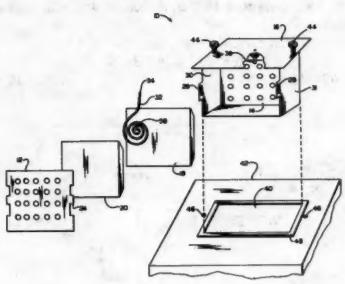
DESICCANT SYSTEM

John Sussmeier, Danbury, Conn., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Sep. 6, 1988, Ser. No. 240,972

Int. Cl.[4] B01D *53/04*

U.S. Cl. 55—387 **3 Claims**



1. A desiccant system for an enclosure, comprising desiccant material contained in two gas permeable packets each having a flattened side, a perforated box having a cover plate and being adapted for retaining the two packets with the respective flattened sides juxtaposed, and an open tube having a length to internal diameter ratio of at least about ten and further having an outer end open to atmosphere through the cover plate and an inner end positioned centrally between the flattened sides of the packets, the box being insertable into a port in an enclosure with the cover plate adapted to seal the port, whereby the enclosure is maintained at atmospheric pressure and in a gas controlled condition.

4,872,892

AIR PURIFIER

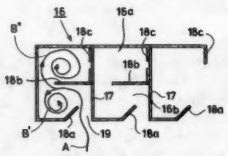
Seppo Vartiainen, Kouvola, and Erkki Aalto, Kausala, both of Finland, assignors to Halton Oy, Finland

Continuation-in-part of Ser. No. 46,243, May 5, 1987, abandoned, which is a continuation of Ser. No. 803,066, Nov. 5, 1985, abandoned. This application Sep. 16, 1988, Ser. No. 245,795

Claims priority, application Finland, Mar. 9, 1984, 840978

Int. Cl.[4] B01D *45/12*

U.S. Cl. 55—345 1 Claim



1. An air purifier (10) comprising a purifier part (11) having at least two air purifier modules (16) being placed substantially in parallel to each other and operating on the centrifugal separation principle, each of said modules having at least one vortex chamber (16*a*, 16*b*), a partition (17) separating said air purifier modules (16) from each other, an inflow aperture (19) and an outlet, wherein

each vortex chamber (16*a*, 16*b*) extends along an entire length of a longitudinal dimension of said air purifier module (16),

said inflow aperture (19) is positioned to co-operate with said partition (17) and with a guide member (18*a*) to direct each air flow (A) entering said purifier part (11) through one of said inflow apertures (19) to proceed in a constant helical motion (B', B'') to said outlet of said air purifier module (16), such that said air flow (A) through said vortex chamber (16*a*, 16*b*) is only in a direction substantially perpendicular to the direction in which said air flow (A) enters through said inflow aperture (19).

4,872,893

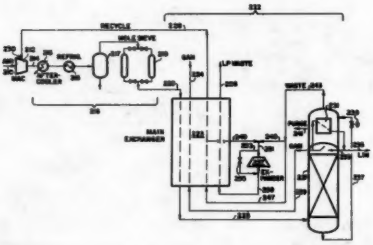
PROCESS FOR THE PRODUCTION OF HIGH PRESSURE NITROGEN

Rakesh Agrawal, Allentown, and Steven R. Auvil, Macungie, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Oct. 6, 1988, Ser. No. 254,528

Int. Cl.[4] F25J *3/00*

U.S. Cl. 62—11 19 Claims



1. A process for the recovery of nitrogen from a feed gas stream containing nitrogen and oxygen whereby a pressurized condition is retained in an oxygen-enriched recycle process stream comprising the steps of:

(a) compressing a feed gas stream containing nitrogen and oxygen to an elevated pressure;

(b) introducing the elevated pressure feed gas stream into a cryogenic separation zone to recover a high purity nitrogen product and an oxygen-enriched waste stream from said zone, and

(c) removing an elevated pressure recycle stream, having an oxygen content above that of the feed gas stream of step (a), from said cryogenic separation zone and at least maintaining the oxygen content of said recycle stream, recycling said stream at elevated pressure to the feed gas stream for introduction into the cryogenic separation zone.

4,872,894

METHOD FOR RAPID PREPARATION OF HALIDE GLASSES

Joseph J. Hutta, Groton, Mass., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

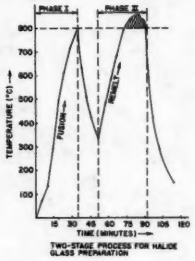
Filed May 26, 1988, Ser. No. 202,659

Int. Cl.[4] C03B *37/018*

U.S. Cl. 65—3.11 9 Claims

1. A method of rapidly forming fluorozirconate and fluorohafnate glasses, the glasses having multiple components in a starting mixture, one or more of the components being volatile at an elevated temperature, said starting mixture being placed in a crucible, the crucible being near a source of controllable heat from a furnace, the crucible being in a sealed chamber having a controlled inert, reactive or slightly oxidizing atmosphere, the method comprising the steps of:

a. heating the mixture to a temperature such that substantially all of the mixture melts to form a first melt, said heating occurring in about one half hour to a temperature in the range of about 750 to 890 degrees centigrade;



b. cooling the first melt by removing the source of heat to at least the temperature where the first melt becomes a non-liquid mixture;

c. heating said non-liquid mixture in a short period of time to a temperature where the mixture completely melts to form a second melt;

d. allowing the homogenization of said second melt for a short period of time; and

e. cooling the second melt by removing the source of heat therefrom.

4,872,895

METHOD FOR FABRICATING ARTICLES WHICH INCLUDE HIGH SILICA GLASS BODIES

James W. Fleming, Westfield; David W. Johnson, Jr., Pluckemin; John B. MacChesney, Lebanon, and Sandra A. Pardenek, Westfield, all of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 11, 1986, Ser. No. 940,392

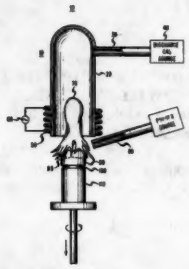
Int. Cl.[4] C01B *33/18*

U.S. Cl. 65—18.1 9 Claims

1. A method for fabricating an article comprising silica-containing glass, the method comprising the steps of:

forming silica-containing gel particles, said forming step including the step of mechanically subdividing (1) an ungelled or partially gelled sol capable of yielding a substantially cohesive gel body and/or (2) a gel body which is substantially cohesive and substantially elastic, such that

essentially all of said gel particles are wet and are of substantially uniform size;



fusing said gel particles into a silica-containing glass body; and

completing the fabrication of said article.

4,872,896

PROCESS FOR STRENGTHENING GLASS

William C. LaCourse, Alfred, and Maysood Akhtar, Wellsville, both of N.Y., assignors to Alfred University, Alfred, N.Y.

Filed May 27, 1988, Ser. No. 199,954

Int. Cl.[4] C03C *21/00*

U.S. Cl. 65—30.14 **20 Claims**

1. A process for strengthening a glass article, comprising the steps of:

(a) providing a glass article comprised of from about 1 to about 30 weight percent of at least one compound of a first monovalent exchangable cation wherein said cation is selected from the group consisting of sodium, potassium, lithium, silver, copper, and mixtures thereof;

(b) coating the surface of said glass article with a source of a second cation, wherein:

said second cation has an ionic radius larger than that of said first cation, and

2. said second cation is selected from the group consisting of sodium, potassium, silver, copper, and mixtures thereof; and, thereafter

(c) subjecting said coated glass article to a source of microwave radiation at a frequency of from about 0.9 to about 22.1 Gigaherz, whereby said second cation is caused to penetrate the surface of said glass article to a depth of from about 10 to about 100 microns.

4,872,897

BOTTOM TAP OF A GLASS MELTING FURNACE AND METHOD OF OPERATING THE SAME

Heinrich Krejci, Marktheidenfeld, and Rudi Kessel, Lohr/Main, both of Fed. Rep. of Germany, assignors to Sorg GmbH & Co. KG, Lohr/Main, Fed. Rep. of Germany

Filed Feb. 8, 1989, Ser. No. 308,126

Claims priority, application Fed. Rep. of Germany, Feb. 8, 1988, 3803730

Int. Cl.[4] C03B *5/26*

U.S. Cl. 65—128 **8 Claims**

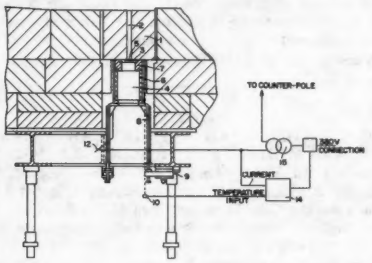
1. A discontinuously operatable bottom tap of a glass melting furnace, comprising:

a tap brick with a tap hole in which glass is frozen when the tap is not in operation and seals the tap, a tap gate of refractory and non-oxidizing metal urged against the tap brick underneath the tap hole which is connected as an electrode to a counter-electrode situated in a glass bath, a tap chamber situated underneath the tap gate, and a removable insulation for the tap chamber.

7. A method of operating a bottom tap of a glass melting furnace comprising a tap brick with a tap hole in which glass is frozen when the tap is not in operation and seals the tap, a tap gate of refractory and non-oxidizing metal urged against the tap brick underneath the tap hole which is connected as an electrode to a counter-electrode situated in a glass bath, a tap chamber situated underneath the tap gate, and a removable insulation for the tap chamber, the method comprising:

to put the tap into operation, performing an insulating of the tap chamber;

after a sufficient temperature is reached at the gate, producing a flow of current between the gate and the counter-electrode;



removing the insulation, the flow of glass beginning upon continued heating; and

interrupting the input of electrical energy, to end the withdrawal of glass, after which the glass again solidifies in the tap brick.

4,872,898

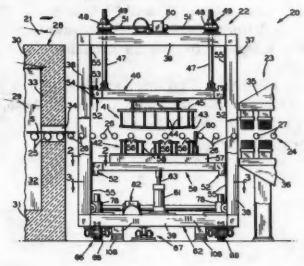
CENTERING AND LEVELING OF MOBILE PRESS BENDING APPARATUS

Allan T. Enk, Toledo, Ohio, and Jeffrey R. Flaugher, Carlton, Mich., assignors to Libbey-Owens-Ford Co., Toledo, Ohio

Filed Feb. 17, 1989, Ser. No. 312,120

Int. Cl.[4] C03B *23/033*

U.S. Cl. 65—287 **17 Claims**



1. In glass sheet bending apparatus of the type including, in aligned sequence, heating, press bending, and tempering sections, said press bending section comprising upper and lower bending members and associated conveyor rolls operatively mounted upon a mobile carriage for movement as a unit transversely into and out of operative position in said aligned sequence, the improvement wherein said mobile carriage includes a base framework, wheels affixed to said base adapted for movement along spaced carriage rails, means vertically moving said base and carriage between a raised transport position whereat said wheels are extended for supporting said carriage upon said rails and a lowered operating position whereat said wheels are retracted, means for supporting said carriage at a predetermined elevation in said operating position with said wheels retracted, and means carried by said base for locating said carriage in a predetermined position of transverse alignment relative to said heating and tempering sections and securing said carriage in said predetermined position.

4,872,899

TREATMENT OF PLANT CHLOROSIS WITH RHODOTORULIC ACID

Gene W. Miller, Providence, Utah, assignor to Utah State University Foundation, Logan, Utah

Continuation of Ser. No. 718,858, Apr. 2, 1985. This application May 22, 1987, Ser. No. 54,088
Int. Cl.[4] C05F *11/00*
U.S. Cl. 71—11 21 Claims

1. A method of treating iron chlorosis in plants comprising the step of administering to said plants a sufficient quantity of rhodotorulic acid to provide said plants with increased capacity to absorb iron in usable form.

4,872,900

BIOREGULATOR BASED ON PLANT RAW MATERIALS AND METHOD FOR PRODUCING SAME

Branco R. Gajic, Bulevar Lenjina 105/7, Novi Beograd, 11070, Yugoslavia, assignor to Patentverwertungsgesellschaft bürgerlichen Rechts; Götz Dorndorf, both of Frankfurt am Main, Fed. Rep. of Germany and Branco Gajic, Yugoslavia

Filed Feb. 24, 1988, Ser. No. 159,991
Claims priority, application Yugoslavia, Feb. 27, 1987, 309/87
Int. Cl.[4] C05F *11/10*
U.S. Cl. 71—23 8 Claims

1. Bioregulator based on plant raw materials which comprises the following main components belonging to the family Caryophillaceae:

(a) 20 to 30 weight % Herniaria
(b) 8 to 14 weight % Buffonia
(c) 10 to 16 weight % Spergula
(d) 30 to 40 weight % Ortega
(e) 5 to 7 weight % Arenaria
(f) 6 to 8 weight % Sagina, and
(g) 4 to 6 weight % Holesteum

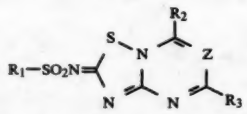
4,872,901

HERBICIDAL PYRAZOLE SULFONYL IMINO-2H-1,2,4-THIADIAZOLO[2,3-A9 PYRIMIDINES

Isao Aoki, Kawanishi; Takashi Kuragano, Takarazuka; Nobuyuki Okajima, Osaka, and Yoshiyuki Okada, Suita, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Oct. 22, 1986, Ser. No. 921,420
Claims priority, application Japan, Oct. 25, 1985, 60-240258
Int. Cl.[4] A01N *43/90*; C07D *497/22*
U.S. Cl. 71—90 9 Claims

1. A compound of the formula



wherein R_1 is a pyrazolyl group which is unsubstituted of mono- to tri-substituted by a lower alkyl group, a lower alkenyl group, a lower alkynyl group, a lower alkoxy group, a lower alkenyloxy group, an aryl group of 6 to 12 carbon atoms, an aryloxy group of 6 to 12 carbon atoms, an aralkyl group of 7 to 10 carbon atoms, an aralkyloxy group of 7 to 10 carbon atoms, an acyl group derived from an organic carboxylic acid but excluding carbamoyl, an acyloxy group in which the acyl group is derived from an organic carboxylic acid but excluding carbamoyloxy, a carbamoyl group, a carbamoyloxy group, sulfamoyl, halogen, a carboxy group which may be esterified, or cyano or said pyrazolyl group is mono-substituted by nitro or a group of the formula:

in which R_4 is an organic residue and n is an integer of 0, 1 or 2;

R_2 and R_3 respectively are a lower alkyl group or a lower alkoxy group; and Z is CH.

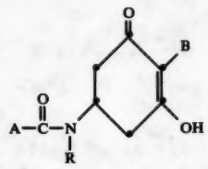
4,872,902

CYCLOHEXANEDIONES AND THEIR USE AS PLANT GROWTH REGULATORS

Hans-Georg Brunner, Lausen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Feb. 8, 1988, Ser. No. 153,376
Claims priority, application Switzerland, Feb. 9, 1987, 469/87
Int. Cl.[4] A01N *33/02, 33/08*; C07C *149/40, 101/44*
U.S. Cl. 71—105 14 Claims

1. Compounds of formula I



(I)

in which

R is hydrogen or C_1–C_6-alkyl,

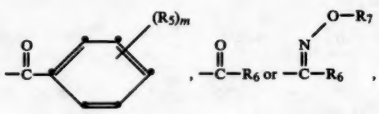
A is R_2, OR_3 or NR_3R_4,

R_2 is C_1–C_6 alkyl that is unsubstituted or is mono-substituted by C_1–C_4-alkoxy or mono- or poly-substituted by halogen, or is C_3–C_6-cycloalkyl,

R_3 is C_1–C_6-alkyl or C_3–C_6-cycloalkyl, or is phenyl or benzyl each of which is unsubstituted or is mono-, di- or tri-substituted by R_5,

R_4 is hydrogen, C_1–C_6-alkyl, C_1–C_4-alkoxy or C_3–C_6-cycloalkyl,

B is one of the radicals



m is 0, 1, 2 or 3,

R_5 is halogen, nitro, cyano, C_1–C_4-alkyl, C_1–C_4-alkoxy, C_1–C_4-alkylthio, C_1–C_4-haloalkyl, C_1–C_4-alkylsulphinyl or C_1–C_4-alkylsulphonyl,

R_6 is C_1–C_6-alkyl or C_3–C_6-cycloalkyl, and

R_7 is hydrogen, C_1–C_6-alkyl, C_1–C_6-haloalkyl, C_3–C_6-alkenyl, C_3–C_6-haloalkenyl or C_3–C_6-alkynyl,

and salts of the compounds of formula I with acids, bases or complexformers.

12. A herbicidal or growth-regulating composition which contains as active ingredient an effective amount of a compound of formula I according to claim 1, together with carriers and/or other adjuvants.

4,872,903

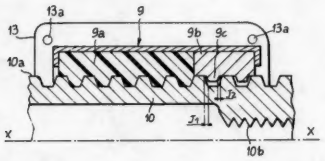
SCREW JACK SAFE AGAINST OVERLOAD FOR A MOVABLE ELEMENT SUCH AS A SEAT STRUCTURE

Pierre Periou, Cergy Pontoise, France, assignor to Rockwell-CIM, France

Filed Oct. 3, 1988, Ser. No. 252,216
Claims priority, application France, Oct. 8, 1987, 87 13917
Int. Cl.[4] F16H *25/24*
U.S. Cl. 74—89.15 4 Claims

1. A screw jack safe against overload for a movable element such as a seat structure, said screw jack comprising a support, a tubular primary screw movable in rotation and in translation and provided with an outer screw thread and an inner screw thread which screw threads have opposite screw thread hands, a fixed secondary screw fixed relative to the support and en-

gaged in the inner screw thread of the primary screw, nut means for connection to said movable element, said nut means being engaged with the outer screw thread of the primary screw, the nut means being composite and comprising a first



nut composed of a plastics material which has a good coefficient of friction, and a second nut which is composed of a mechanically strong material.

4,872,904

TUNGSTEN CARBIDE POWDER AND METHOD OF MAKING FOR FLAME SPRAYING

Mitchell R. Dorfman, Smithtown, N.Y., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Jun. 2, 1988, Ser. No. 201,507

Int. Cl.[4] B22F *9/00*

U.S. Cl. 75—0.5 BA **7 Claims**

1. A method of making a cobalt bonded tungsten carbide powder useful for flame spraying, comprising:

preparing a mixture consisting essentially of a first tungsten carbide powder having a particle size of −5 microns, a second tungsten carbide powder having a particle size of −44+10 microns, a cobalt powder having a particle size of −5 microns and a carbon powder having a particle size of −1 micron, the mixture having proportions, by weight totaling 100%, of about 10% to 30% first tungsten carbide, 40% to 80% second tungsten carbide, 8% to 25% cobalt and 0.5 to 3% carbon; and

processing the mixture by compacting the mixture to produce a compacted product, sintering the compacted product to produce a sintered product, crushing the sintered product to produce a crushed product, and classifying the crushed product to produce the cobalt bonded tungsten powder.

4,872,905

METHOD OF PRODUCING NON-AGGLOMERATING SUBMICRON SIZE PARTICLES

Roy S. Bourne, Clearwater; Clarence C. Eichman, Indian Rocks Beach, and William W. Welbon, Bellair, all of Fla., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed May 11, 1988, Ser. No. 192,555

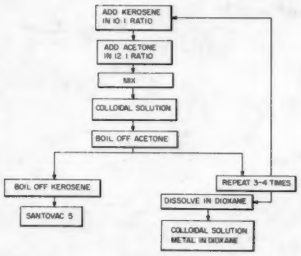
Int. Cl.[4] C23C *15/00*

U.S. Cl. 75—0.5 C **24 Claims**

1. A process for forming non-agglomerating metallic particles having a size of less than one micron in diameter, comprising:

providing particles by a sputtering technique;

capturing said particles in a high molecular weight low vapor pressure oil; and



recovering the captured particles from the oil, said particles being covered with a molecular layer of oil that prevents agglomeration.

4,872,906

PROCESS AND PLANT FOR PRODUCING BINDER-FREE HOT BRIQUETTES

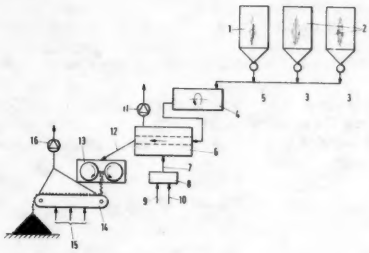
Rudolf Auth, Dorsten; Lothar Seidelmann, Duisburg, and Heinz Maas, Dinslaken, all of Fed. Rep. of Germany, assignors to Thyssen Stahl AG, Duisburg, Fed. Rep. of Germany

Filed Mar. 16, 1988, Ser. No. 168,708

Claims priority, application Fed. Rep. of Germany, Apr. 2, 1987, 3711130

Int. Cl.[4] C22B *1/24*

U.S. Cl. 75—5 **13 Claims**



1. A process for the production of binder-free hot briquets of finely particulate non-pyrophoric residual substances accumulating in the production and processing of iron and steel and containing substantially no combustible components, for use in smelting, wherein :

a) fuel in a finely particulate form is admixed to the residual substances,

b) a quantity of external heat is fed from outside to the mixture of residual substances and fuel, until the fuel ignites, the quantity of fuel added being such that the temperature of the residual substances reaches the range of 600° to 900° C., and

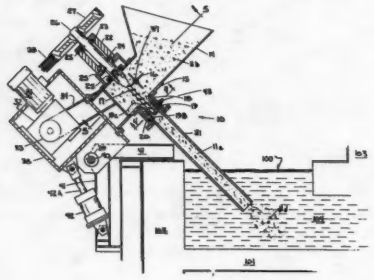
c) the residual substances are then immediately hot-briquetted without intermediate cooling at a temperature in the aforementioned range.

4,872,907

METAL CHIP FURNACE CHARGE APPARATUS AND METHOD

Larry D. Areaux, Nathrop, Colo., assignor to Pre-Melt Systems, Inc., Kalamazoo, Mich.

Filed Jun. 30, 1988, Ser. No. 213,365
Int. Cl.[4] C21B 9/16; F27B 14/16
U.S. Cl. 75—65 R 49 Claims



1. A method for the industrial utilization of metal chips which involves the introduction of said metal chips into a mass of molten metal of which said chips are formed, comprising the steps of:

providing a delivery conduit of a material which is resistant to the mass of molten metal, under the temperature and other conditions present therein,

compacting and extruding said metal chips into said delivery conduit in the form of a densified mass,

creating a pressure upon the densified mass of chips in the delivery conduit,

causing the densified mass of chips in the delivery conduit to substantially fill said delivery conduit and to move along said delivery conduit,

causing said delivery conduit to dip into said mass of molten metal so as to provide a point of introduction below the surface thereof,

causing the densified mass of chips within the delivery conduit to exit from said delivery conduit directly into said mass of molten metal at said point of introduction below the surface thereof, and

maintaining a pressure upon the densified mass of chips within the delivery conduit sufficient to prevent substantial entry of the mass of molten metal into said delivery conduit.

4,872,908

METAL TREATMENT

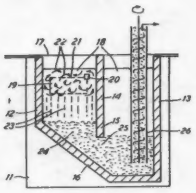
Philip G. Enright, Hook Norton; Andrew J. Hobbis, and Ronald E. Tapping, both of Banbury, all of England, assignors to Alcan International Limited, Quebec, Canada

Filed Dec. 31, 1987, Ser. No. 140,268
Claims priority, application United Kingdom, Dec. 31, 1986, 8631085
Int. Cl.[4] C22B 21/00; C22C 24/00
U.S. Cl. 75—68 R 29 Claims

1. A method of forming a filter cake for filtering liquid metal comprising the steps of:

(a) disposing a liquid metal permeable substrate in a flow path of the liquid metal to be filtered and

(b) disposing particles that are stable with respect to the liquid metal into said flow path, upstream of the substrate, so that said particles are carried at least partially, as well



as wetted, by the metal flow and dispersed as a pre-wetted and pre-primed filter cake on the substrate.

4,872,909

PROCESS FOR ACID LEACHING OF MANGANESE OXIDE ORES AIDED BY HYDROGEN PEROXIDE

James P. Allen, and Richard R. Corwin, both of Salt Lake City, assignors to The United States of America, as Represented by the Secretary of the Interior, Washington, D.C.

Filed Aug. 8, 1988, Ser. No. 229,408
Int. Cl.[4] C22B 3/00
U.S. Cl. 75—101 R 7 Claims

1. A method of processing manganese ore, containing manganese, nickel, and cobalt metals comprising the steps of:

adding the manganese ore to an aqueous solution of acid and H_2O_2 to form a leach pulp wherein said leach pulp contains up to about 40 weight percent solids, about 20 weight percent acid, and about 10 weight percent H_2O_2;

agitating said leach pulp for up to about 1 hour period at a temperature of about 0° C. to 100° C.;

separating the leach pulp into a solid fraction and a liquid fraction containing manganese, nickel, and cobalt solubilitized metals; and

recovering the solubilized manganese, nickel, and cobalt metals from the liquid fraction.

4,872,910

ANTISTATIC FLOOR POLISH

James M. Eshleman, Manheim, and Kenneth K. Ko, West Grove, both of Pa., assignors to Armstrong World Industries, Inc., Lancaster, Pa.

Filed Aug. 12, 1988, Ser. No. 231,457
Int. Cl.[4] C09G 1/10
U.S. Cl. 106—3 18 Claims

1. A conductive composition comprising at least one metal crosslinking latex binder and a metal salt/polymer matrix where the polymer is polyethylene or polypropylene oxide.

4,872,911

STOP LEAK COMPOSITION

David H. Walley, 3621 Club Estates Dr. #2, Muskogee, Okla. 74403, and Marvin R. DeVries, 3823 S. 99th East Ave., Tulsa, Okla. 74146

Continuation-in-part of Ser. No. 947,881, Dec. 30, 1986, abandoned. This application Apr. 21, 1988, Ser. No. 184,199
Int. Cl.[4] C09K 3/10; E21B 33/00
U.S. Cl. 106—33 2 Claims

1. A stop leak composition for a cooling system of a vehicle which comprises a tridimensional cross-linked superabsorbent hydrogel particulate polymer having a non-uniform particle geometry such as acicular and/or cuboidal with an aspect ratio of from about 1 to about 10,

a first particle fraction having an average size less than the average leak size,

a second particle fraction having particles of an average size

about one order of magnitude greater than the average size of the leak,

said particles having a specific gravity which is from about 1.25 g/cc to about 1.40 g/cc with a blown density which has a neutral buoyancy condition in an ethylene glycol antifreeze.

4,872,912

WET AND DRY LAID PHOSPHATE REACTIVE SHEETS AND PHOSPHATE CERAMIC STRUCTURES MADE THEREFROM

Jeffery L. Barrall, and Robert C. Garman, both of Lancaster, Pa., assignors to Armstrong World Industries, Inc., Lancaster, Pa.

Filed Nov. 13, 1987, Ser. No. 119,863

The portion of the term of this patent subsequent to Dec. 20, 2005, has been disclaimed.

Int. Cl.[4] C04B *9/06, 28/34*

U.S. Cl. 106—85 **42 Claims**

1. A phosphate reactive composition consisting essentially of a wet-laid substrate which is a mixture that includes calcium silicate as a phosphate reactant, wherein the calcium silicate is in the substrate in an amount effective to produce a phosphate ceramic material, a non-reactive matrix in an amount effective to hold the wet-laid substrate together, said matrix being either (i) fiber or (ii) fiber and a binder, and a metal oxide as a phosphate reactant, said metal oxide being selected from the group consisting of zinc oxide, aluminum oxide, calcium oxide and magnesium oxide.

4,872,913

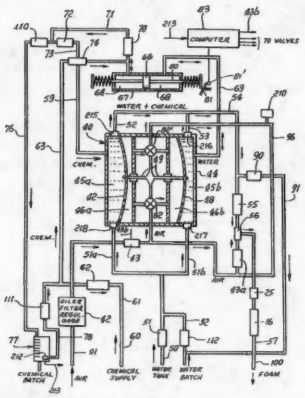
APPARATUS AND METHOD TO PRODUCE FOAM, AND FOAMED CONCRETE

Harvey R. Dunton, Victorville, and Donald H. Rez, Newport Beach, both of Calif., assignors to Standard Concrete Products, Inc., Santa Ana, Calif.

Continuation of Ser. No. 3,028, Jan. 12, 1987, abandoned. This application Jun. 20, 1988, Ser. No. 208,579

Int. Cl.[4] C04B *24/14, 38/10*

U.S. Cl. 106—88 **8 Claims**



1. The method of producing an improved concrete that includes:

(a) providing a synthetic resinous foaming agent, in liquid form, to a reciprocating pump and repeatedly drawing said agent and water into the pump for combining the foaming agent with water in the pump to continuously form a liquid mix, and repeatedly discharging quantities of the liquid mix from the pump,

(b) adding pressurized air to the mix discharged from the pump, sub-dividing the mix into droplets, in a confined flowing stream, and reducing the stress confinement, whereby the droplets expand to form a foam,

(c) forming an aqueous calcareous concrete mix, said concrete mix containing said particles, calcareous cement particles, aggregate pieces and water, adding said foam to the concrete mix, and sizing the foam before adding it to the concrete mix, to pass only bubbles of about 5 to 25 micron sphere size to the concrete mix, and mixing together the concrete mix and added foam bubbles of said micron sphere size,

(d) the ratio by volume of foam added to the concrete mix being between ¼and 5 cubic feet of foam per cubic yard of concrete mix,

(e) the bubbles passed to the concrete mix having substantially the same sizes as the cement particles,

(f) the mix and foam being added to a rotary drum on a delivery truck, and mixing the concrete mix and foam by rotating said drum as the truck travels to a job site.

4,872,914

HIGH PURITY, HIGH TEMPERATURE PIPE THREAD SEALANT PASTE

Ronald A. Howard, Brook Park, Ohio, assignor to Union Carbide Corporation, Danbury, Conn.

Filed Apr. 29, 1988, Ser. No. 187,846

Int. Cl.[4] C09D *3/00*

U.S. Cl. 106—285 **7 Claims**

1. A pipe thread sealant paste composition comprising from about 30 to about 80 percent by weight of natural flake graphite particles of a size sufficient to pass through a 100 Tyler mesh sieve and a liquid carrier comprising a mixture of mineral oil and from 5 to 60 percent by weight petrolatum.

4,872,915

ORTHORHOMBIC LEAD CHROMATE PIGMENTS OF GREENISH HUE

Leonardus J. H. Erkens; Gerben P. Algra; Jacobus M. H. Snijders, all of Maastricht; Herman J. J. M. Geurts, Kerkrade, all of Netherlands, and André Pugin, Pont-la-Ville, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 755,886, Jul. 17, 1985, abandoned. This application Mar. 3, 1987, Ser. No. 22,617

Claims priority, application Switzerland, Jul. 25, 1984, 3600/84; Jan. 30, 1985, 398/85

Int. Cl.[4] C09C *1/20*

U.S. Cl. 106—433 **14 Claims**

1. An orthorhombic lead chromate pigment of greenish hue, which contain lead chromate and lead sulfate in the weight ratio of 60:40 to 100:0, and which is characterised by a tinctorial strength of 0.067 to 0.103 at a standard depth of shade of 1/25 in accordance with DIN 53 235 and by an opacity factor Y_{black}/Y_{white} of 0.78 to 0.87, which pigment is obtainable by

mixing an aqueous solution of a lead salt with an aqueous solution of a chromate and, when the pigment contains lead sulfate, of a sulfate, under high turbulence.

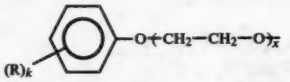
4,872,916

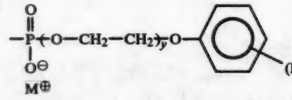
PHOSPHATE ESTER PIGMENT DISPERSANT

Joseph A. Latosky, Cincinnati, Ohio, assignor to Sun Chemical Corporation, Fort Lee, N.J.

Filed Sep. 22, 1988, Ser. No. 248,002
Int. Cl.[4] C08K *5/00*
U.S. Cl. 106—503 15 Claims

1. An aqueous pigment dispersion comprising a pigment and a dispersing agent having the formula:





wherein:

R and R′ are the same or different, linear or branched alkyl groups of 2 to 12 carbon atoms;

k and l are the same or different integers having a value of 1 or 2;

x and y are the same or different integers having values of greater than 1 but less than 13; and,

M is a cation.

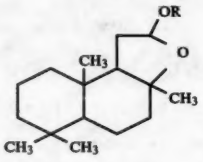
4,872,917

SCLARAI ALKYL ETHERS AND SMOKING COMPOSITIONS CONTAINING A SCLARAL ALKYL ETHER FLAVORANT

Charles R. Howe; Everett W. Southwick, both of Richmond, and Richard H. Cox, Midlothian, all of Va., assignors to Philip Morris Incorporated, New York, N.Y.

Filed Jan. 13, 1986, Ser. No. 818,452
Int. Cl.[4] A74B *3/12*
U.S. Cl. 131—275 13 Claims

1. A smoking composition comprising an admixture of (1) combustible filler selected from natural tobacco, reconstituted tobacco and tobacco substitutes, and (2) between about 0.0001 and 2 weight percent, based on the total weight of filler, of a sclaral ether flavorant additive corresponding to the formula:



where R is an alkyl group containing between about 2–4 carbon atoms.

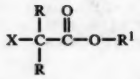
4,872,918

HETEROCYCLIC ESTERS AND SMOKING COMPOSITIONS CONTAINING A HETEROCYCLIC ESTER FLAVORANT-RELEASE ADDITIVE

Kenneth F. Podraza, and Yoram Houminer, both of Richmond, Va., assignors to Philip Morris Incorporated, New York, N.Y.

Filed May 12, 1986, Ser. No. 861,945
Int. Cl.[4] A24B *3/12, 15/36*
U.S. Cl. 131—277 24 Claims

1. A smoking composition comprising an admixture of (1) combustible filler selected from natural tobacco, reconstituted tobacco and tobacco substitutes, and (2) between about 0.0001–5 weight percent, based on the total weight of filler, of a flavorant-release additive corresponding to the formula:



where X is a heteroaromatic substituent containing between about 3–20 carbon atoms; R is hydrogen or an alkyl radical containing between about 1–4 carbon atoms; and R^1 is an allylic aliphatic radical containing between about 10–25 carbon atoms.

4,872,919

METHOD FOR REMOVING PRECIPITATED CALCIUM CITRATE FROM JUICE PASTEURIZATION OR STERILIZATION EQUIPMENT

Michael S. Bucher, Wyoming; Paul J. Russo, Cincinnati, both of Ohio, and Robert J. Schaar, Edgewood, Ky., assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jan. 28, 1988, Ser. No. 149,465
Int. Cl.[4] B08B *3/08*
U.S. Cl. 134—3 19 Claims

1. A method for removing calcium citrate which has precipitated from a calcium-containing fruit juice stream and which has deposited on the interior surface of juice pasteurization or sterilization equipment, said method comprising the steps of:

(a) contacting the interior surface of the juice pasteurization or sterilization equipment, at a temperature of at least about 150° F. (65.6° C.), with an aqueous acid solution having a pH of from about 0 to about 4.5 and containing from about 0.5 to about 20% by weight of an acid selected from the group consisting of acetic acid, fumaric acid, lactic acid, gluconic acid, adipic acid, citric acid, phosphoric acid, sulfuric acid, hydrochloric acid, nitric acid, malic acid and mixtures thereof to remove precipitated calcium citrate deposited on the interior surface; and

(b) removing the calcium citrate-laden solution from the equipment.

4,872,920

ASBESTOS REMOVAL METHOD AND SYSTEM

Tom S. Flynn, 10 Willow Ave., Larkspur, Calif. 94939, and Joe L. de Figueiredo, 5431 Sacramento Ave., Richmond, Calif. 94804

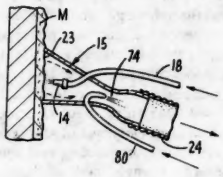
Filed Nov. 25, 1987, Ser. No. 125,478
Int. Cl.[4] B08B *5/04*
U.S. Cl. 134—21 10 Claims

1. A method of removing bound asbestos-containing materials from substrates, comprising the steps of directing at least one stream of low pressure steam to penetrate asbestos-containing material sufficiently to loosen binders therein so that the material can be easily dislodged from a substrate, and directing a controlled stream of higher pressure steam against the asbestos-containing material for dislodging the same from the substrate.

10. A method for removing bound asbestos-containing materials from substrates, said method comprising the steps of:

directing at least one stream of pressurized heated fluid to

penetrate asbestos-containing material sufficiently to loosen binders in the material so that the material can be easily dislodged from a substrate to which said substrate is bound;



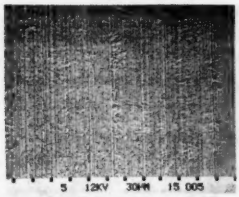
by suction, drawing asbestos particles and fibers entrained by the pressurized heated fluid into a suction inlet means and ejecting a portion of the pressurized heated fluid directly into the suction inlet to assist the suction to prevent clogging of the suction inlet means.

4,872,921

SHEETS OF ALUMINIUM ALLOY CONTAINING MAGNESIUM, SUITABLE FOR PRODUCING BODIES OF CANS BY DRAWING AND IRONING, AND METHOD OF OBTAINING SAID SHEETS

Didier Teirlinck, St. Egreve, France, assignor to Cegedur Societe de Transformation de l'Aluminium Pechiney, Paris, France

Filed May 27, 1987, Ser. No. 199,796
Claims priority, application France, Jun. 24, 1987, 87 09271
Int. Cl.[4] C22F *1/04*
U.S. Cl. 148—2 **13 Claims**



5. A method of producing sheets of aluminum alloy containing 0.1 to 5% by weight mangesium comprising taking strip of said alloy as it comes from a casting machine or after at least one rolling pass, subjecting said strip to chemical etching so as to reduce its thickness by a maximum of 2 microns, and annealing in air at from 330° to 450° C. for at least 30 minutes, to produce sheets of said alloy having, over 10 to 25% of their surface, uniformly distributed particles of amorphous aluminum oxides and crystalline magnesium and aluminum oxides, in the form of flat discs less than 5 microns thick and having diameters distributed around a mean value of 2 to 15 microns.

4,872,922

METHOD AND APPARATUS FOR THE ION IMPLANTATION OF SPHERICAL SURFACES

Stephen N. Bunker, Burlington, and Piran Sioshansi, Bedford, both of Mass., assignors to Spire Corporation, Bedford, Mass.

Filed Mar. 11, 1988, Ser. No. 167,632
Int. Cl.[4] C23C *11/10*
U.S. Cl. 148—4 **16 Claims**

1. A method for the ion implantation of spherical workpieces comprising:

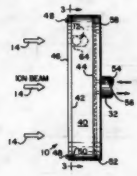
(a) providing a fixture accommodating and presenting a plurality of spherical workpieces to an ion beam, said fixture provided with a plurality of ball cages loosely to contain said plurality of workpieces;

(b) cleaning said fixture of contaminants;

(c) providing a plurality of spherical workpieces intended to be ion implanted;

(d) cleaning said plurality of spherical workpieces of contaminants;

(e) placing said plurality of spherical workpieces into said plurality of both cages of said fixture;



(f) exposing each of said plurality of spherical workpieces uniformly and at substantially normal incidence to said ion beam so as to ion implant the same to a uniform predetermined depth and dose; and

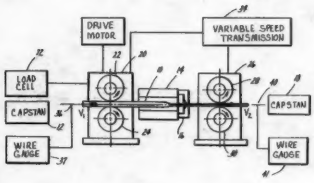
(g) wherein said fixture both rotates said plurality of spherical workpieces about their respective axes and also rocks them back and forth while exposing them to said ion beam.

4,872,923

DIE-LESS DRAWING METHOD AND APPARATUS

Daniel J. Borodin, Warren, Mich., assignor to U.S. Automation Co., Detroit, Mich.

Continuation-in-part of Ser. No. 80,605, Aug. 8, 1987, Pat. No. 4,826,542. This application Oct. 5, 1987, Ser. No. 104,684
The portion of the term of this patent subsequent to May 2, 2006, has been disclaimed.
Int. Cl.[4] C21D *8/00*
U.S. Cl. 148—11.5 R **26 Claims**



1. A method for changing a metallic material having a first microstructure, and a first cross-section, said material being capable of changing to a second micro-structure upon being heated to a critical temperature and then being cooled, said method comprising the steps of:

continuously moving the material along a path of motion adjacent a heating means to progressively heat the material while it is in motion, according to a selected temperature gradient, to a level above said critical temperature level;

then, as the material continues in motion, reducing the temperature of the material such that the material changes to a second micro-structure that depends upon said selected temperature gradient, and

elongating the material as it is in said motion during both the heating step and the cooling step.

4,872,924

METHOD OF PRODUCING SHADOW MASK OF COLOR CATHODE RAY TUBE

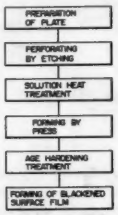
Masaharu Kumada, and Akira Misumi, both of Mobara, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 17, 1987, Ser. No. 85,763

Claims priority, application Japan, Sep. 12, 1986, 61-213834; Sep. 12, 1986, 61-213835

Int. Cl.[4] C21D *7/14*

U.S. Cl. 148—12.1 12 Claims



1. A method of producing a shadow mask for use in a color cathode ray tube, comprising the steps of: preparing an alloy sheet having a composition consisting of 30 to 50 wt % of Ni, to 5 wt % of Ti, up to 2 wt % Cr and the balance substantially Fe and incidental impurities: perforating said alloy sheet by etching; subjecting the etched alloy sheet to a solution treatment at a temperature ranging between 850° and 1000° C.; forming the alloy sheet after the solution treatment into a predetermined form; subjecting the formed alloy sheet to an age-hardening treatment by holding said alloy sheet at a temperature ranging between 650° and 750° C.; and subjecting the formed alloy sheet to a surface blackening treatment so as to oxidize titanium of the composition of the alloy sheet, thereby forming a black film on the surface of said alloy sheet.

4,872,925

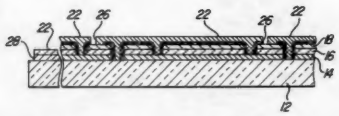
PHOTOVOLTAIC CELL FABRICATION METHOD AND PANEL MADE THEREBY

Harold A. McMaster, Woodville, Ohio, assignor to Glasstech, Inc., Perrysburg, Ohio

Filed Oct. 29, 1987, Ser. No. 114,683

Int. Cl.[4] H01L *27/14, 31/18*

U.S. Cl. 136—244 19 Claims



1. A photovoltaic panel including at least two serially connected photovoltaic cells comprising:

a glass substrate:

at least a first transparent electrically conductive sheet electrode disposed on said substrate;

at least a second transparent electrically conductive sheet electrode disposed on said substrate spaced from and electrically isolated from said first transparent sheet electrode;

at least one layer of photovoltaic semiconductor material disposed on each of said first and second transparent sheet electrodes and in continuous electrical contact therewith, each said layer of semiconductor material having at least one opening therethrough to expose a portion of the respective said first and second transparent sheet electrodes therethrough;

a pair of electrically conductive sheet-like back electrodes, one disposed on each of said layers of semiconductor material to form two adjacent photovoltaic cells, each of said back electrodes having at least one opening therethrough mating said at least one opening through the respective layer of semiconductor material;

a dielectric layer disposed on each of said back electrodes including the internal surface of said at least one opening therethrough, said dielectric layer disposed on a first of said two photovoltaic cells having an opening exposing its back electrode therethrough along the length of its edge adjacent to the second of said two photovoltaic cells;

a vacuum deposited third electrically conductive sheet electrode disposed on said dielectric layer of said second photovoltaic cell and extending onto a portion of said first photovoltaic cell, said third sheet electrode electrically isolated from said back electrode of said second photovoltaic cell and electrically contacting said transparent sheet electrode thereof through said at least one opening through said layer of semiconductor material and said back electrode and electrically contacting said back electrode of said first photovoltaic cell through said opening through said dielectric layer; and

means permitting electrical contact to said transparent sheet electrode of said first photovoltaic cell and said back electrode of said second photovoltaic cell.

4,872,926

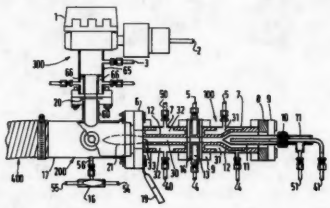
PROCESS FOR HEAT TREATING METALS OR METAL ALLOYS IN A THERMAL PLASMA

Frederick Giacobbe, Naperville, Ill., assignor to American Air Liquide, New York, N.Y.

Filed Dec. 30, 1987, Ser. No. 139,405

Int. Cl.[4] C21D *1/52*

U.S. Cl. 148—13.1 14 Claims



1. A method for localized heat treating of a workpiece of metal to a predetermined depth in a plasma flame generated by plasma generating means, comprising the steps of:

directing inert gas through the plasma generating means;

igniting the inert gas in the plasma generating means to produce a plasma flame having a temperature exceeding 10,000° C.;

moving the workpiece into the plasma flame path;

rotating the workpiece at a speed fast enough so that significant cooling does not occur between the position where said workpiece is heated in said plasma flame and the position in which the surface temperature of the workpiece is monitored;

monitoring the surface temperature of said workpiece by noncontact surface temperature measurement means;

varying the inert gas flow rate through the plasma generating means, in response to the monitored surface temperature, to thereby control the temperature of the plasma flame and thus the workpiece surface temperature in order to maintain a predetermined heating rate and to rapidly reach the desired soaking temperature for the workpiece;

extinguishing the plasma flame; and

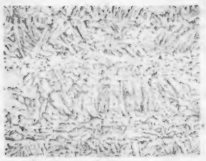
quenching the workpiece.

4,872,927

METHOD FOR IMPROVING THE MICROSTRUCTURE OF TITANIUM ALLOY WROUGHT PRODUCTS

Daniel Eylon, Dayton; Francis H. Froes, Xenia, both of Ohio, and Charles F. Yolton, Coraopolis, Pa., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Dec. 4, 1987, Ser. No. 128,841
The portion of the term of this patent subsequent to Feb. 28, 2006, has been disclaimed.
Int. Cl.[4] C21D *1/00*
U.S. Cl. 148—20.3 6 Claims



1. A method for improving the microstructure of wrought titanium alloy material which comprises the steps of hydrogenating the material at a temperature near or greater than the titanium-hydrogen eutectoid temperature of 815° C., said temperature of hydrogenation being in the range of about 780° to 1020° C. to a hydrogen level of about 0.50 to 1.50 weight percent, cooling the thus-hydrogenated material to room temperature at a controlled rate, heating the thus-cooled, hydrogenated material to a temperature of about 650° to 750° C., applying a vacuum to dehydrogenate the material and cooling said material to room temperature at a controlled rate.

4,872,928

SOLDER PASTE

Wayne Jacobs, San Diego, Calif., assignor to Johnson Matthey Inc., Valley Forge, Pa.

Filed Jun. 7, 1988, Ser. No. 210,045
Int. Cl.[4] B23K *35/34*
U.S. Cl. 148—24 7 Claims

1. A water-soluble solder paste consisting essentially of at least 70% by weight solder powder, 0.5 to 10% by weight water-soluble organic activator selected from the group consisting of alkylamine acid salt, lower alkanolamine and acid, the balance being essentially a mixture of polyethylene glycols.

4,872,929

COMPOSITE EXPLOSIVE UTILIZING WATER-SOLUBLE FUELS

John J. Mullay, Hazeltown, Pa., assignor to Atlas Powder Company, Dallas, Tex.

Filed Aug. 29, 1988, Ser. No. 237,773
Int. Cl.[4] C06G *31/28*
U.S. Cl. 149—46 9 Claims

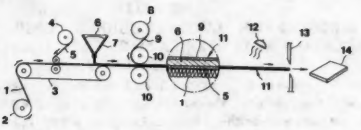
1. An explosive composition comprising:
(a) 60 to 90% of a solid oxidizer; and
(b) 10 to 40% emulsion consisting essentially of
(i) 10 to 80% water
(ii) 0.5 to 5.0% of an emulsifier effective to form a water-in-oil emulsion
(iii) 2 to 25% of a water immiscible carbonaceous fuel
(iv) 20 to 90% of a water miscible fuel.

4,872,930

METHOD FOR MANUFACTURING CARPET TILES HAVING EXCELLENT DIMENSIONAL STABILITY

Teruo Kajikawa, Yokosuka, and Toshio Yoshino, Zama, both of Japan, assignors to Nippon Oil Co., Ltd., Japan

Continuation of Ser. No. 752,891, Jul. 8, 1985, abandoned. This application Jan. 19, 1988, Ser. No. 147,034
Claims priority, application Japan, Jul. 9, 1984, 59-142035
Int. Cl.[4] B32B *31/08, 31/12, 31/30*
U.S. Cl. 156—72 5 Claims



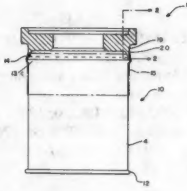
1. A method for manufacturing carpet tiles having excellent dimensional stability comprising the steps of:
(a) allowing a reticulated glass fiber base having a small thermal coefficient of linear expansion and an opening ratio of 33 to 95% and a unit weight of 73 to 225 g/m^2 to contact with the whole surface of the back of a tufted or needle-punched carpet base material in order to form a composite material, and,
(b) thermally melting a backing material prepared from a composition containing as the major component, a thermoplastic material selected from the group consisting of asphalt, polyolefin and olefin-polar monomer copolymer, and applying the melted material to the composite material on the side of the reticulated fabric base thereof by T-die extrusion.

4,872,931

HEAT SHRINK LABELING MACHINE WITH EXTENDED CHUCK

Monte C. Mitchell, Modesto, Calif., assignor to B & H Manufacturing Company, Inc., Ceres, Calif.

Filed May 18, 1988, Ser. No. 195,694
Int. Cl.[4] B29C *53/04*
U.S. Cl. 156—86 2 Claims



1. A machine for applying a label or other sheet or film material to the cylinder surface of a cylindrical article having a body portion and two end portions, at least one of said end portions sloping inwardly from the cylinder surface of the body portion, said machine including a pair of chucks arranged in axial alignment whereby they can clamp such article between them with the ends of the article in contact with the chucks, said chucks being mounted for orbital movement about the central axis of the machine and for spinning about their individual axes, and means for imparting such orbital and spinning motion to the chucks with such an article clamped between them, at least one of said chucks being formed with an extension which is an integral part of the chuck and which overlies the respective end portion of the article and provides a smooth 360° continuation of the cylinder surface of the arti-

cle, whereby when a heat shrinkable label or sheet is wrapped around the article with at least one edge thereof detached from the article, such chuck extension provides an unyielding surface bearing against the detached edge or edges.

4,872,932

METHOD FOR MAKING RUBBERY COMPOSITE MATERIALS BY PLATING A METAL SUBSTRATE WITH A COBALT ALLOY

Masato Yoshikawa, Tokyo; Yukio Fukuura, Kawagoe; Setsuo Akiyama, Kodaira; Makoto Nakamura, Fujimi; Kazuo Naito, Kawasaki, and Toshio Honda, Akigawa, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 919,012, Oct. 15, 1986, abandoned. This application Apr. 15, 1988, Ser. No. 182,083
Claims priority, application Japan, Oct. 15, 1985, 60-229638; Oct. 15, 1985, 60-229639; Oct. 15, 1985, 60-229640
Int. Cl.[4] C25D *5/24*
U.S. Cl. 156—151 8 Claims

1. A method for preparing a rubbery composite material comprising a metal substrate and a rubber composition bonded thereto, comprising the steps of:

depositing a cobalt or cobalt alloy thin film having a thickness of from about 10 Å to 100 μm on the surface of a metal substrate by a dry plating process selected from the group consisting of ion plating, DC and RF magnetron sputtering, bipolar sputtering and RF sputtering processes, said cobalt alloy having more than 80% by weight of cobalt and

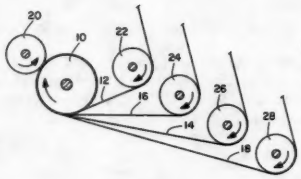
holding a rubber composition in intimate contact with said cobalt or cobalt alloy thin film under heat and pressure to achieve vulcanization bonding, said rubber composition being free of an organic cobalt salt.

4,872,933

METHOD OF FORMING RAPIDLY DISINTEGRATING PAPER TUBES

Richard R. Tews, Appleton, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Division of Ser. No. 032,833, Mar. 30, 1987, Pat. No. 4,792,326. This application Aug. 5, 1988, Ser. No. 229,065
Int. Cl.[4] B32B *1/00*
U.S. Cl. 156—184 20 Claims



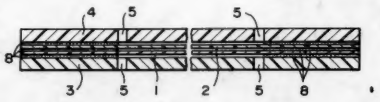
12. A method of forming a cube comprising providing at least one web of paper, at least one web comprising an adhesive film and at least one layer comprising a superabsorbent material, wrapping the webs on a mandrel, and heating to seal said webs together to form a tube.

4,872,934

METHOD OF PRODUCING HYBRID MULTI-LAYERED CIRCUIT SUBSTRATE

Eiichi Kameda, Ushiku, Japan, assignor to Nippon Mektron, Ltd., Tokyo, Japan

Filed Jun. 23, 1988, Ser. No. 210,637
Claims priority, application Japan, Jun. 30, 1987, 62-162570
Int. Cl.[4] B32B *31/18*
U.S. Cl. 156—250 20 Claims



1. A method of producing a hybrid multi-layered circuit substrate comprising the steps of:

disposing first and second sheets having a layer of copper on at least a first side thereof on respective opposite surfaces of a flexible circuit substrate means in registration with one another, the flexible circuit substrate means having formed thereon a predetermined conductive circuit pattern, said first and second sheets having integral separation means which at least in part define a boundary between a flexible portion and a rigidized hybrid portion of a multi-layer hybrid circuit substrate to be produced;

adhesively bonding said first and second sheets to said flexible circuit substrate means only in a region of the flexible circuit substrate means which is to become part of a hybrid circuit in the multi-layered circuit substrate;

forming through-hole conductors between said first and second sheets and said flexible circuit substrate means at said hybrid portion;

producing a pre-determined circuit pattern on both of said first and second sheets within the bounds of said hybrid portion; and

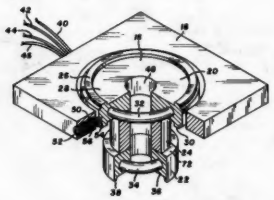
severing said first and second sheets along the desired outer profile of said hybrid circuit portion and along the desired outer profile line of the flexible circuit portion to produce a hybrid multi-layered circuit substrate having a flexible portion and a rigid hybrid portion, the profile line of the flexible circuit portion encompassing said separation means.

4,872,935

APPARATUS AND METHOD FOR BONDING A PLASTIC CONTAINER AND SPOUT

Raymond K. Newkirk, and Richard L. Batzlaff, both of Plymouth, Minn., assignors to Forward Technology Industries, Inc., Minneapolis, Minn.

Filed Nov. 28, 1988, Ser. No. 276,888
Int. Cl.[4] B29C *65/20;* B30B *15/34*
U.S. Cl. 156—250 11 Claims



1. An apparatus for forming a fusion bond between a container and a tubular spout constructed of a plastic, said apparatus comprising:

a first fixture for supporting a plastic tubular spout in a longitudinal orientation and in spaced apart relation to a plastic container, said first fixture reciprocable to move said spout longitudinally toward and away from a generally transverse wall section of the container;

a heating tool including an inner end segment and an outer end segment spaced apart from and axially aligned with the inner end segment, said inner and outer end segments having selected first and second transverse profiles, respectively;

a first element for heating said inner end segment, and a second element for heating said outer end segment; and

a second fixture for supporting said heating tool in a longitudinal orientation, axially aligned with said tubular spout and disposed between said spout and container, said second fixture reciprocable to move the tool longitudinally toward and away from said container wall section to permit the advancing of said inner end segment when heated against and through said container wall section to form a bore having said first selected profile, and allowing further longitudinal advancement of the tool to form an engagement of said outer end section of the tool against a rim area of said container surrounding said bore;

wherein said second fixture further is movable transversely to remove said tool from between the spout and container, thereby permitting longitudinal travel of said first fixture a sufficient amount to move an inner edge portion of said spout into surface engagement with said rim area.

9. A process for bonding a tubular plastic spout to a molded plastic container, including the steps of:

supporting a tubular spout in a longitudinal orientation and in spaced apart relation to a generally transverse wall section of a plastic container;

supporting a bore forming means between said tubular spout and said container wall section and in an axial alignment with the spout;

heating said bore forming means to a temperature sufficient to rapidly melt the plastic, and advancing the bore forming means longitudinally inward toward the container wall section until the bore forming means travels through the container wall section, thus to form a bore therethrough;

positioning a heating means against a rim area of the container wall section surrounding said bore, and longitudinally advancing said spout to position a lead end of said spout against said heating means;

heating the heating means above the fusion temperature of the plastic to simultaneously fuse said rim area and said lead end; and

withdrawing said heating means and longitudinally advancing said spout until said lead end and rim area engage, and allowing said lead end and rim area to cool, thereby to form a bond to said spout and container.

4,872,936
POLYMERIZABLE CEMENT MIXTURES

Jürgen Engelbrecht, Hamburg, Fed. Rep. of Germany, assignor to Ernst Muhlbauer KG, Hamburg, Fed. Rep. of Germany

Continuation of Ser. No. 916,589, Oct. 8, 1986, abandoned. This application May 9, 1988, Ser. No. 191,650

Claims priority, application Fed. Rep. of Germany, Oct. 9, 1985, 3536076

Int. Cl.[4] C09J 5/02

U.S. Cl. 156—307.3 **36 Claims**

1. A polymerizable cement mixture comprising

(a) at least one polymerizable unsaturated monomer, oligomer or prepolymer containing an acid group or a reactive acid derivative thereof,

(b) at least one finely divided reactive filler that can react ionically with the acids or acid derivative of (a), and

(c) a curing agent.

34. A method for adhering (a) an oxidic, mineral, vitreous, ceramic, metallic or biological substrate to (b) an oxidic, vitreous, ceramic, metallic, biological or acrylic substrate, comprising the steps of

(c) applying to said substrate (a) a mixture according to claim 1;

(d) bringing said substrate (b) in good contact with said mixture on said substrate (a) and

(e) causing that mixture to harden.

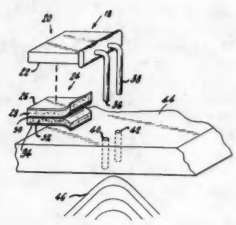
4,872,937
ELECTRICAL COMPONENT AND METHOD OF MOUNTING SAME

Thomas E. Gouldy, South Williamsport, Pa., assignor to GTE Products Corporation, Stamford, Conn.

Filed Jul. 14, 1988, Ser. No. 220,857

Int. Cl.[4] C09J 7/00

U.S. Cl. 156—313 **7 Claims**



1. The method of mounting an electrical component, comprised of a body having a major surface and having two lead-in wires extending from said body orthogonal to said major surface; and a mounting entity therefor, said mounting entity comprising, in layered order; a pressure sensitive adhesive affixed to said major surface; a flexible spacer attached to said pressure sensitive adhesive; and a heat sensitive adhesive attached to said spacer, upon a printed circuit board comprising the steps of: positioning said component upon a surface of said board with said lead-in wires penetrating said board, and said heat sensitive adhesive in contact with said surface of said board; and raising the temperature of said surface to a sufficient degree to activate said heat sensitive adhesive and fix said component to said board.

4,872,938
PROCESSING APPARATUS

Cecil J. Davis, Greenville; Joseph V. Abernathy, Wylie; Robert T. Matthews, Plano; Randall C. Hildenbrand, Richardson; Bruce Simpson, Dallas; John I. Jones; Lee M. Loewenstein, both of Plano, and James G. Bohlman, Forney, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 73,939, Jul. 16, 1987, abandoned. This application Apr. 25, 1988, Ser. No. 188,128

Int. Cl.[4] B44C 1/22; B05D 3/06; C03C 15/00

U.S. Cl. 156—345 **4 Claims**

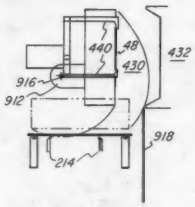
1. An apparatus for processing of wafers, comprising:

(a) a vacuum processing chamber;

(b) a wafer support within said process chamber, said wafer support being capable of supporting a wafer in a substantially face down position with substantially no damage to structures on the face of said wafer;

(c) a wafer transfer mechanism positioned to controllably transfer wafers through an openable port into said process

chamber, said wafer transfer mechanism being capable of operation under high vacuum;



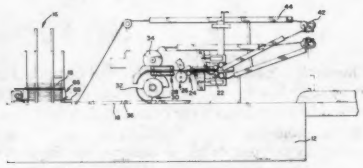
(d) said wafer support being movable to rotate said wafer from said substantially face down position into a more nearly vertical position.

4,872,939

APPARATUS FOR ASSEMBLING LINED PACKAGING TRAY

David R. McVay; Lawrence D. Carter, both of Hazlehurst, Ga.; John D. Jonasky, Fresno, Calif., and Chris A. Jefferson, Hazlehurst, Ga., assignors to Amoco Corporation, Chicago, Ill.

Filed Apr. 23, 1987, Ser. No. 41,390
Int. Cl.[4] B65H *3/08*; B65G *59/10*
U.S. Cl. 156—354 **6 Claims**



1. In an apparatus for preparing a pad-lined packaging tray, having means for denesting flanged trays that are horizontally oriented in a vertical stack in a magazine, a novel and improved denester comprising:

A. at least two opposed, vertically arranged rotary denester members;

B. means to synchronously rotate said members;

C. each denester member comprising a vertical member having mounted thereon;

(1) a horizontally oriented lower plate member which extends laterally to underlie and support the bottom of the lowermost of said stacked trays during rotation of said denester member about its vertical axis

(2) a horizontally oriented upper plate member that is vertically spaced from said lower plate, having a radius smaller than that of the lower plate, wherein said upper plate member extends laterally to underlie and support flanges of a next succeeding tray to a tray in the process of being denested during rotation of said denester member; and

(3) an inclined, planar cam plate that extends laterally outwards from the vertical member of said denester below the upper plate, extends downwardly to below and is free of the lower plate member, and extends sufficiently laterally outwards of said body whereby to contact a flange of a tray being denested; whereby

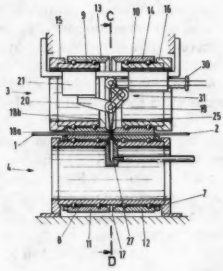
D. on rotation of said at least two denester members the lower plates will first underlie and support a said lowermost tray, then pass out of supporting position while generally coincident therewith the upper plates will commence to support at its flanges the next tray to be subsequently denested and still coincident therewith the inclined cam plates contact the flanges of the tray in the process of being denested, and upon continued rotation of said rotary denester means said inclined cam plates continue to move said flanges whereby the tray is forcefully ejected to a receiving means disposed below said magazine.

4,872,940

APPARATUS FOR THE CONTINUOUS WELDING OF STRIPS AND/OR SHEETS

Josep Strum, Duisburg, and Wilfried Prange, Dinslaken, both of Fed. Rep. of Germany, assignors to Thyssen Stahl Aktiengesellschaft, Duisburg, Fed. Rep. of Germany

Filed Jul. 13, 1988, Ser. No. 218,711
Claims priority, application Fed. Rep. of Germany, Jul. 17, 1987, 3723611
Int. Cl.[4] B23K *26/02, 26/08, 26/14*
U.S. Cl. 156—379.8 **10 Claims**



1. An apparatus for the continuous welding of abutting strips or sheets comprising one or more welding heads for one or more fixed laser beams and tension rollers disposed in pairs on opposite of the strips or sheets to be welded, the axes of said tension rollers extending perpendicularly with respect to the direction of travel of the strips or sheets with the respective rollers of said pairs of rollers disposed on opposite lateral sides of an abutting line of said strips or sheets, the tension rollers comprising hollow shafts and roller shells mounted thereon and spaced out at an axial distance from one another, each welding head of the laser beam being disposed inside the hollow shaft of at least one tension roller, the laser beam passing through a gap between the roller shells and an opening in the hollow shaft.

4,872,941

AUTOMATIC WELDING APPARATUS FOR WELDING THERMOPLASTIC MATERIALS IN SHEET FORM

Glenn W. Lippman, 169 S. Buchanan Ave., Louisville, Colo. 80027-9505, and Gerald Lippman, 3403 2nd St., Oceanside, N.Y. 11572

Filed Nov. 9, 1987, Ser. No. 118,601
Int. Cl.[4] B44C *7/00*
U.S. Cl. 156—497 **20 Claims**

1. An apparatus for welding a pair of overlapping thermoplastic materials in sheet form along the overlapping portions thereof, said apparatus comprising:

a chassis of elongate configurations having a length and a width respectively forming a pair of sides, a front end and a rear end, said chassis being operable to be positioned lengthwise over the overlapping portions with said front and rear ends straddling the overlapping portions of the materials;

means, connected to said front end of said chassis in an overlying relationship with respect to the overlapping

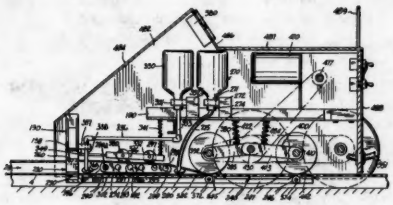
portions, for maintaining a separation between the materials at the overlapping portions thereof, said means including a pair of horizontally overlapping channels, vertically spaced from one another and vertically spaced from the materials with each of said channels being sized and oriented to receive one of the overlapping portions of the materials;

means, located within the separation and connected to said chassis, for heating the overlapping portions of said materials to plasticity;

means, connected to said chassis and situated between said rear end of said chassis and said plasticity heating means in an overlapping relationship with respect to the materials, for urging the materials together into the overlapping position and against one another, said urging means including:

a pair of pressure rollers located in tandem relationship with respect to one another and between said front and said rear ends of said chassis;

means for pivotally attaching said rollers to said chassis;



a guide plate for rectangular planar, elongate configuration, sized to extend from said separation maintaining means to at least said rollers, said guide plate being connected to said separation maintaining means beneath said channels and being located between said sides of said chassis, above the thermoplastic materials, said guide plate serving to maintain the overlapping portions of the materials in alignment with each other and to prevent the overlapping portions from contacting any obstacles on the terrain underlying the overlapping portions; and

means, connected to said pivotal roller attachment means, for biasing said pressure rollers against the materials and said guide plate; and

means, connected to said chassis, for providing a rolling engagement between said chassis and the thermoplastic materials and for supporting said chassis and said separation maintaining means above said thermoplastic materials, whereby as said chassis is propelled along the overlapping portions, the overlapping portions of the materials are heated to plasticity and welded to one another along the overlap within said urging means.

4,872,942

SEAL BAR INCLUDING CLAMPED SEAL ELEMENT

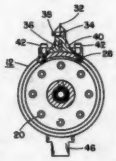
Gordon V. Sharps, Jr., and Eric A. St. Phillips, both of Fairport, N.Y., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Sep. 22, 1987, Ser. No. 99,809

Int. Cl.[4] B32B *31/18, 31/20;* **B65B** *61/10*

U.S. Cl. 156—515 **7 Claims**

1. A device for heat sealing superimposed layers of a layflat web of a thermoplastic film material comprising; a hollow-cylindrical rotatable drum means for a rotary side seal apparatus, a seal bar structure intermittently movable into surface contact with said film layers for imparting an elongated heat seal thereto, said seal bar structure being mounted on the cylindrical surface of said drum means so as to extend in parallel relationship with the longitudinal central axis of said drum means; the improvement comprising: said seal bar structure comprising a first elongated bar member; a second elongated bar member detachably fastened to said first bar member so as to provide flat facing clamping surfaces therebetween; a thin flat elongated ribbon-like seal element constituted of a high temperature-resistant metallic material being clamped along substantially the full length thereof by said first and second bar members between said flat facing clamping surfaces so as to



have a longitudinal edge projecting therefrom for contacting said film material and constituting a heat seal element; and means for imparting a pulsed electrical current to said seal element prior to said seal element contacting said film material so as to rapidly heat said seal element to a predetermined temperature for sealing and concurrently cutting through said layers of the thermoplasitc film material.

4,872,943

PROCESS FOR MAKING MONOCRYSTALLINE HGCDTE LAYERS

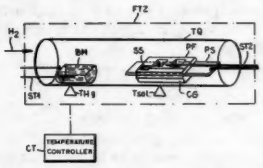
Sergio Bernardi, Turin, Italy, assignor to Selenia Industrie Elettroniche Associate S.p.A., Bacoli, Italy

Filed Jun. 15, 1988, Ser. No. 207,259

Claims priority, application Italy, Jun. 16, 1987, 67519 A/87

Int. Cl.[4] C30B *19/04, 19/06, 19/10*

U.S. Cl. 156—621 **1 Claim**



1. A process for fabricating single-crystal mercury cadmium telluride layers by epitaxial growth on a cadmium telluride substrate, performed inside a reactor with two communicating zones maintained at different and controlled temperatures, said method comprising the steps of:

(a) placing weighed quantities of cadmium and tellurium in a well inside the reactor in a higher-temperature zone, melting the cadmium and tellurium and homogenizing same, so as to produce a solution of cadmium in tellurium;

(b) disposing a mercury bath inside the reactor in a lower-temperature zone and heating said bath so as to obtain a mercury vapor atmosphere through said reactor;

(c) by the absorption of vapor state mercury, converting the solution of step (a) into a solution of cadmium and mercury in tellurium and homogenizing the converted solution by thermal agitation at the higher temperature;

(d) cooling the solution formed in step (c) and the mercury bath slowly so as to produce supersaturation of the solution of cadmium and mercury in tellurium and keeping its composition constant;

(e) contacting a cadmium telluride substrate with the supersaturated solution of step (d) and effecting epitaxial growth of single-crystal mercury cadmium telluride on said substrate from said supersaturated solution; and

(f) controlling the composition of said solution of cadmium

and mercury in tellurium by regulating the lower temperature of the mercury bath, the composition of said supersaturated solution being maintained constant all during epitaxial growth by contemporarily reducing the solution and mercury bath temperatures, but maintaining the reaction between time derivatives of said temperatures equal to the ratio between respective partial derivatives of the partial pressures with temperature.

4,872,944

PROCESS FOR THE CONTROL IN REAL TIME OF THE SELECTIVITY OF THE ETCHING BY ANALYSIS OF THE PLASMA GASES IN A PROCESS OF REACTIVE IONIC ETCHING AND A REACTOR THEREFORE

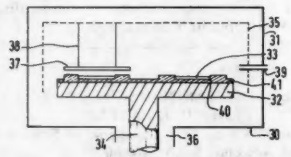
Denis Rufin, Hinsdale, Ill., and Ikuo Hirase, Ibaraki, Japan, assignors to L'Air Liquide, Societe Anonyme Pour l'Etude et l'Explanation des Procedes Georges Claude, Paris, France

Filed Aug. 17, 1988, Ser. No. 233,045

Claims priority, application France, Aug. 20, 1987, 87 11754

Int. Cl.[4] H01L *21/306;* **B44C** *1/22;* **C03C** *15/00, 25/06*

U.S. Cl. 156—626 **9 Claims**



1. Process for the control in real time of etching in a process of manufacturing electronic components obtained by reactive ionic etching of silicon wafers utilizing a plasma produced between two electrodes, wherein the gaseous species of the plasma are analyzed during the etching, at least one of the silicon wafers being withdrawable in situ from the influence of the plasma.

4,872,945

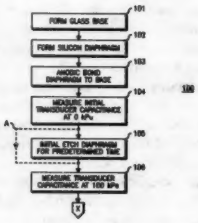
POST SEAL ETCHING OF TRANSDUCER DIAPHRAGM

Donald O. Myers, Carpentersville, and Ruta J. Venclovas, Western Springs, both of Ill., assignors to Motorola Inc., Schaumburg, Ill.

Continuation of Ser. No. 878,453, Jun. 25, 1986, abandoned. This application Aug. 24, 1987, Ser. No. 90,433

Int. Cl.[4] H04R *31/00*

U.S. Cl. 156—627 **20 Claims**



1. A process for manufacturing a sensor comprising the steps of:

providing a transducer by bonding a flexible diaphragm to a base to form said transducer with a cavity being between said diaphragm and base, at least one electrical property of said transducer being varied in accordance with deflection of said diaphragm with respect to said base in response to sensed force applied to said diaphragm;

applying at least one predetermined force to said transducer;

measuring said at least one electrical property of said transducer provided in response to said predetermined force resulting in a deflection of said diaphragm with respect to said base;

calculating, based upon at least said measured at least one electrical property, a quantity corresponding to an amount of thickness reduction of said diaphragm needed to obtain a desired transducer characteristic by altering the flex characteristic of said diaphragm with respect to said base; and then

thinning said transducer diaphragm by removing a portion of said diaphragm from a diaphragm surface external and nonadjacent to said cavity, while said diaphragm is bonded to said base substrate, to reduce the thickness of said diaphragm and thereby alter the flex characteristic of said diaphragm to achieve said desired transducer characteristic, wherein parameters of this thinning step are determined in accordance with said calculated quantity which in turn is determined in accordance with said measured at least one electrical property of said transducer.

4,872,946

METHOD OF MANUFACTURING SUPPORTS FOR LITHOGRAPHIC PRINTING PLATE

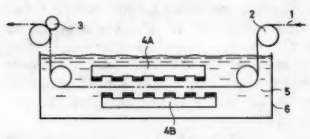
Akio Uesugi; Tsutomu Kakei, and Shinichiro Minato, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 23, 1988, Ser. No. 159,086

Claims priority, application Japan, Feb. 23, 1987, 62-37798; Mar. 25, 1987, 62-69135

Int. Cl.[4] C23F *1/00;* **B44C** *1/22*

U.S. Cl. 156—637 **24 Claims**



1. A method of manufacturing supports for a lithographic printing plate comprising;

chemically treating a metal sheet or web in a treatment solution, and

heating said sheet or web by an induction heating method while said sheet or web is in said treating solution.

4,872,947

CVD OF SILICON OXIDE USING TEOS DECOMPOSITION AND IN-SITU PLANARIZATION PROCESS

David N. Wang, Cupertino; John M. White, Hayward; Kam S. Law; Cissy Leung, both of Union City; Salvador P. Umotoy, Pittsburg; Kenneth S. Collins, San Jose; John A. Adamik, San Ramon; Ilya Perlov, Mountain View, and Dan Maydan, Los Altos Hills, all of Calif., assignors to Applied Materials, Inc., Santa Clara, Calif.

Division of Ser. No. 944,492, Dec. 19, 1986. This application Oct. 26, 1988, Ser. No. 262,992

Int. Cl.[4] B44C *1/22;* **C03C** *15/00, 25/06*

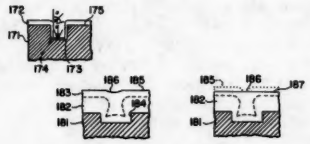
U.S. Cl. 156—643 **14 Claims**

9. A process for planarizing a dielectric layer formed on a substrate in-situ in a chamber, comprising:

first, depositing a first, conformal, relatively thick layer of silicon oxide by exposing the substrate to a reactive

plasma by positioning the substrate on a support within a chamber and adjacent a gas inlet manifold which is an RF electrode and includes a multiplicity of closely-spaced gas outlet holes closely adjacent the substrate; and communicating a gas mixture containing tetraethylorthosilicate into the manifold while applying RF energy between the manifold and the substrate support, with the pressure in the chamber being within the range of about 1 to 50 torr and heating the substrate to within the range of about 200° C. to 500° C.;

second, depositing a second, relatively thin silicon oxide layer on the first silicon oxide layer by applying a mixture comprising ozone, oxygen and tetraethylorthosilicate to



the gas inlet manifold for communicating reactive nitrogen and oxygen species into the vacuum chamber via the outlet holes, while heating the substrate to within the approximate range 200° C. to 500° C. with the chamber pressure within the approximate range 10 to 200 torr; and

third, isotropically etching the resulting composite film by exposing the composite to a plasma formed within said chamber, by communicating a reactive gas selected from fluorinated gases such as NF_3, CF_4 and C_2F_6 into the gas inlet manifold, and applying RF energy between the gas inlet manifold and the substrate support and heating the substrate to within the approximate range 200° C. to 500° C. while maintaining the chamber pressure within the approximate range 200 mt to 20 torr.

4,872,948

METHOD AND APPARATUS FOR CONTROLLING CENTRIFUGAL THIN FILM DRYER

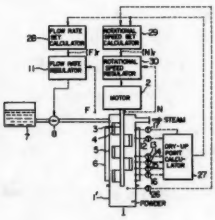
Mitsuo Kinoshita; Tetsuo Ito, both of Hitachi; Hiroji Mikawa, Ibaraki, and Koichi Chino, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 3, 1983, Ser. No. 471,861

Claims priority, application Japan, Mar. 5, 1982, 57-33927

Int. Cl.[4] B01D *1/22*

U.S. Cl. 159—6.2 **5 Claims**



1. A method of controlling a centrifugal thin film dryer wherein said dryer has a dryer vessel including a tubular heating surface and having a delivery port, comprising the steps of reducing the pressure in said dryer vessel to lower than atmospheric pressure, feeding slurry containing solid matter at a variable flow rate to said tubular heating surface, heating said slurry with a heating medium while rotating blades inside of said heating surface so that said slurry travels along said heating surface as a thin film and turns into dry powder, measuring temperatures at a plurality of locations spaced apart along the axial direction of said heating surface upstream from the delivery port of the dryer and controlling the position along said axial direction of said heating surface where a rise in the distribution of said temperatures measured begins to saturate at the vicinity of the heating medium temperature by adjusting at least one of said flow rate, the pressure within said dryer vessel, and the degree of heating by said heating surface on the basis of the temperatures measured to maintain said position upstream from the delivery port of the dryer; and

measuring the moisture content of the dry powder, and controlling the moisture content of the dry powder by adjusting the rotational speed of the rotating blades in dependence upon the moisture content measured and the position along said axial direction of said heating surface where a rise in the distribution of said temperatures measured approaches the saturation temperature of the heating medium.

4,872,949

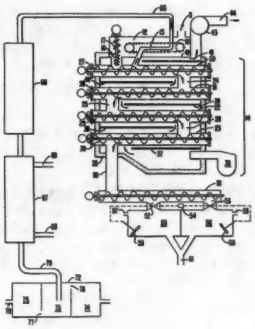
PROCESS FOR TREATMENT OF DRILLING MUD

Carl M. Wilwerding, P.O. Box 561, Klamath Falls, Oreg. 97601

Continuation of Ser. No. 165,324, Mar. 8, 1988, abandoned. This application Jan. 18, 1989, Ser. No. 298,380

Int. Cl.[4] B01D *1/04;* E21B *21/06;* F26B *11/00*

U.S. Cl. 159—47.3 **9 Claims**



1. A process for the removal of organic liquid and water-soluble solids from a drilling mud contaminated therewith, said process comprising:

(a) feeding said drilling mud into a vertical array of a plurality of horizontal tubes through an entry port in the uppermost tube thereof, said horizontal tubes arranged in series in a shell-and-tube heat exchanger;

(b) conveying said drilling mud through said horizontal tubes by screw conveyors to cause said drilling mud to flow from the top of said vertical array downward, while passing combustion gases from a burner upward around the exteriors of said horizontal tubes, thereby heating said drilling mud to evaporate substantially all liquid therefrom, leaving a first solid residue;

(c) removing vapors generated in said horizontal tubes through an exit port adjacent to said entry port thereby effecting counter-current flow of said vapors with respect to said drilling mud;

(d) combining said first solid residue with water to form a slurry consisting of (i) an aqueous solution of substantially all water-soluble materials contained in said first solid residue, and (ii) a second solid residue comprising said first solid residue substantially devoid of said water-soluble materials; and

(e) recovering said second solid residue from said slurry.

7. A process for the removal of organic liquid and water-soluble solids from a drilling mud contaminated therewith, said process comprising:

(a) feeding said drilling mud into a plurality of horizontal tubes arranged in series in a vertical array in a shell-and-tube heat exchanger through an entry port, and conveying said drilling mud through said horizontal tubes by screw conveyors turning at a rate sufficient to substantially prevent said drilling mud from settling, said drilling mud flowing from the top of said vertical array downward, while passing combustion gases from a burner upward over said horizontal tubes to evaporate substantially all liquid from said drilling mud to form a vapor stream and a first solid residue, and removing said vapor stream from said horizontal tubes at a location adjacent to said entry port, thereby effecting counter-current flow of said vapor stream with respect to said drilling mud;

(b) preheating said drilling mud with said vapor stream upstream of said entry port;

(c) condensing said vapor stream to form a condensate containing at least partially immiscible organic and aqueous phases, separating said organic and aqueous phases, and vacuum distilling said aqueous phase prior to disposal to remove therefrom substantially all organic species dissolved therein;

(d) combining said first solid residue with water to form a slurry consisting of (i) an aqueous solution of substantially all water-soluble materials contained in said first solid residue, and (ii) a second solid residue comprising said first solid residue substantially devoid of said water-soluble materials; and

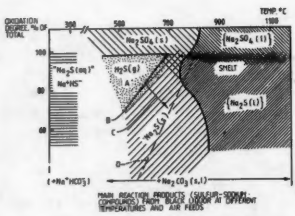
(e) decanting said aqueous solution from said slurry and vacuum filtering said second solid residue from the portion of said slurry remaining after said decantation to recover said second solid residue from said slurry.

4,872,950

PROCESS FOR RECOVERING ENERGY AND CHEMICALS FROM SPENT LIQUOR IN PULP PREPARATION

Alf O. Andersson, Kofallsvägen 38, S-710 40 Frövi, and Björn S. Warnqvist, Tingsvögen 44, S-183 40 Täby, both of Sweden

Filed Nov. 17, 1987, Ser. No. 121,795
Claims priority, application Sweden, Nov. 28, 1986, 8605116
Int. Cl.[4] D21C *11/04, 11/06, 11/10, 11/12*
U.S. Cl. 162—15 **9 Claims**



1. A process for recovering energy and chemicals from spent liquor containing organic materials in pulp preparation, said liquor being thermally decomposed after concentration, forming gaseous and solid products and energy being recovered from the gases, the process comprising: concentrating said spent liquor containing organic materials; and thermally decomposing said concentrated spent liquor, wherein said thermal decomposition is carried out in a single step at a supply of oxygen in an amount corresponding to from 5 to 75% of the stoichiometric amount required for a complete oxidation, at a pressure of from 10 to 50 bar and at a temperature of from 700° to 850° C. such that no melt is formed, wherein the formation of carbon from included organic materials is suppressed and wherein the thermal decomposition forms sulfur-containing gases which are recovered by being absorbed in an alkaline solution.

4,872,951

STARCH BLENDS USEFUL AS EXTERNAL PAPER SIZES

Walter Maliczyszyn, Somerville, and Henry R. Hernandez, Flemington, both of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Jul. 13, 1988, Ser. No. 218,380
Int. Cl.[4] D21H *1/38*
U.S. Cl. 162—135 **24 Claims**

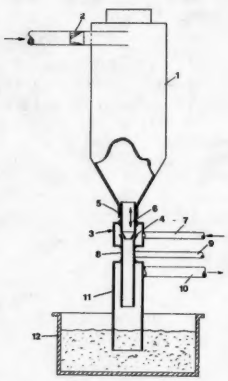
11. In a process of external sizing of paper or paperboard the improvement which comprises the step of applying to the surface thereof an effective amount of a starch blend which comprises an admixture of 10–70% (by wt) of a cationic starch and 30–90% by wt and and 30–90% (by wt) of an ASA-treated starch, said ASA-treated starch being a monoester of an alkenyl succinate, such that the pore size of said paper or paperboard is reduced while the water resistance remains unchanged or is enhanced.

4,872,952

METHOD FOR MANUFACTURING A BOARD- OR SHEET-SHAPED MATERIAL WITH A HIGH PROPORTION OF GLASS OR MINERAL WOOL FIBRES

Lars Alsterhäll, Svanskog, Sweden, assignor to Swanboard Masonite AB, Svanskog, Sweden

Filed May 18, 1987, Ser. No. 50,424
Claims priority, application Sweden, May 16, 1986, 8602231
Int. Cl.[4] D21H *5/18*
U.S. Cl. 162—152 **5 Claims**



1. A method for manufacturing sheet material containing a high proportion of glass wool or mineral wool fibers, comprising:

providing a cyclone having an upper inlet and a lower outlet;

injecting fibers of glass wool or mineral wool into the cyclone through the inlet, in an air stream, whereby, in passing through the cyclone in said air stream, the fibers are separated into fiber tufts, which are ejected through said outlet;

forcing a stream of fluid selected from the group consisting of steam and water into said fiber tufts as said fiber tufts emerge from said cyclone through said outlet, thereby accelerating the fibers, replacing air within and around

said fiber tufts, with said fluid and wetting the fibers in said fiber tufts;

separating the resultingly wetted fibers from air which has emerged from the cyclone with the fiber tufts, to provide a wetted fiber-containing aqueous phase;

mixing the wetted fiber-containing aqueous phase with paper pulp and a binding agent to provide a mixture thereof; and

supplying the mixture to an operative sheet manufacturing machine as input thereto.

4,872,953

APPARATUS FOR IMPROVING THE QUALITY OF PAPER MANUFACTURED FROM RECYCLED PAPER WITH A HYDROKINETIC AMPLIFIER

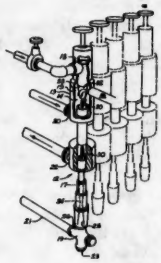
William E. Smith, Greenville, S.C., assignor to EZE Products, Inc., Greenville, S.C.

Continuation-in-part of Ser. No. 943,615, Dec. 18, 1986, Pat. No. 4,726,880. This application Feb. 16, 1988, Ser. No. 157,052

The portion of the term of this patent subsequent to Feb. 23, 2005, has been disclaimed.

Int. Cl.[4] D21C *5/02*

U.S. Cl. 162—261 **6 Claims**



1. An apparatus for improving the quality of paper manufactured from a contaminated fibrous stock including secondary fiber, contaminants smaller than a predetermined size, and contaminants with a specific gravity approximately that of the specific gravity of whitewater used in the production of recycled paper stock, the apparatus comprising:

a source of steam;

a source of contaminated fibrous stock;

a hydrokinetic amplifier means having a mixing chamber connected to each of steam inlet, a stock inlet and a venturi, said amplifier means having an outlet connected to said venturi, said mixing chamber having an interior wall, said steam inlet connected to said source of steam for allowing steam to enter said mixing chamber, said stock inlet connected to said source of contaminated fibrous stock for receiving said contaminated fibrous stock and structured for supplying same to said mixing chamber in the form of a vertical liquid column which is substantially out of contact with said interior wall, said amplifier means for mixing in said mixing chamber said contaminated fibrous stock with steam entering through said steam inlet and thereby condensing said steam to transfer the energy of said steam to said contaminated fibrous stock to increase the temperature of said contaminated fibrous stock from said stock inlet to said outlet, said amplifier means for subjecting said contaminants in said contaminated fibrous stock to increased pressure in said venturi to produce dispersed contaminants in said contaminated fibrous stock, said outlet for supplying contaminated fibrous stock having dispersed contaminants therein and at a pressure and temperature substantially greater than the pressure and temperature of said contaminated fibrous stock received by said stock inlet, a treatment device coupled to said outlet of said hydrokinetic amplifier for further emulsifying and dispersing contaminants contained in said fibrous stock exiting from said outlet of said hydrokinetic amplifier, said treatment device including means for mechanically manipulating said fibrous stock as it passes through said treatment device.

4,872,954

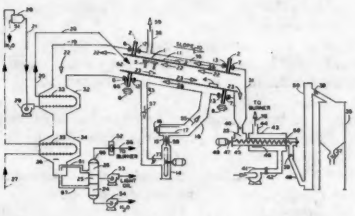
APPARATUS FOR THE TREATMENT OF WASTE

Jim S. Hogan, 1742 Country Club Dr., Sugar Land, Tex. 77478

Filed Nov. 24, 1987, Ser. No. 124,976

Int. Cl.[4] B01J *8/10*

U.S. Cl. 202—105 **42 Claims**



1. A retort for treating waste, comprising:

a sloped rotating drum having a front end and a back end, the front end being in a higher position with respect to the back end;

rotating means being mounted to the drum for rotating the drum;

fins being affixed to the exterior surface of the drum;

scrapers being mounted in the drum for scraping material from the surface of the drum;

baffles mounted in the interior surface of the drum;

a drum enclosure for enclosing the drum and forming a chamber therebetween, the chamber being isolated from the interior of the drum;

a burner being mounted apart from the drum and having a fire tube, the burner generating hot exhaust gases;

a first conduit for conveying the hot exhaust gases to the chamber where the exhaust gases release heat to the drum whereby the exhaust gases are cooled;

a second conduit for returning cooled exhaust gases from the chamber to the burner, flowing the returned cooled exhaust gases over the fire tube to cool the fire tube, and mixing the returned cooled exhaust gases with hot exhaust gases generated by the burner;

a fan being mounted in the second conduit for providing the driving force for conveying the exhaust gases from the burner to the chamber and for returning the cooled exhaust gases to the burner;

a damper being mounted in the second conduit for regulating the amount of cooled exhaust gases being returned to the burner from the chamber;

an exhaust line for exhausting exhaust gases to the atmosphere;

a seal for sealing the chamber from the atmosphere whereby fluid communication between the chamber and the atmosphere is provided through the exhaust line only;

a screw conveyor being connected to the back end of the drum by a collection chamber, the screw conveyor having an inlet and an outlet;

a conveyor enclosure enclosing a portion of the conveyor and forming a flow passage therebetween, the flow passage having an inlet and an outlet;

an air compressor being connected to the inlet of the flow passage;

an air conduit for connecting the outlet of the flow passage to the air inlet of the burner;

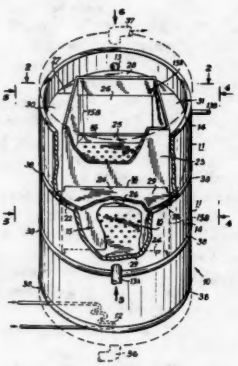
a collector being connected to the outlet of the screw conveyor;
a bucket elevator being connected to the collector and having a bucket elevator discharge;
a storage tank being connected to the bucket elevator discharge;
a vapor conduit being in fluid communication with the front end of the drum;
an accumulator being connected to the outlet of the vapor conduit;
an overhead line connecting the overhead of the accumulator with the fuel burning side of the burner;
a compressor for providing a driving force for vapors slowing in the overhead line;
a first liquid line for removing liquid from one section of the accumulator;
a second liquid line for removing liquid from another section of the accumulator;
a first pump being connected to the first liquid line;
a second pump being connected to the second liquid line;
a pressure equalizing line connecting the second exchanger and the accumulator;
a feed conduit being connected to the front end of the drum;
a first heat exchanger for providing heat exchange between the feed conduit and the vapor conduit;
a second heat exchanger for providing heat exchange between the feed conduit and the vapor conduit;
a centrifuge being connected to the feed conduit; and
a feed pump being connected to the feed conduit.

4,872,955

VAPOR/LIQUID CONTACT COLUMN STRUCTURE

Trent J. Parker, and Byron M. Parker, both of Salt Lake City, Utah, assignors to Uni-Frac Inc., Salt Lake City, Utah

Continuation-in-part of Ser. No. 840,134, Mar. 17, 1986, Pat. No. 4,750,975. This application Apr. 18, 1988, Ser. No. 182,887
The portion of the term of this patent subsequent to Jun. 14, 2005, has been disclaimed.
Int. Cl.[4] B01D *3/16, 47/00*
U.S. Cl. 202—154 **17 Claims**



1. A column section arranged in a vertical stack of other column sections, said section comprising:
a vertical conduit having upper and lower ends,
a vapor and liquid horizontal contract device secured to and extending transversely across said conduit;
an inlet means and an exit means disposed in said contact device disposed in opposite to one another;
a reflux liquid admittance throat means in said conduit and connected with said inlet means and a gas admittance and liquid discharge means proximate said contact device exit means;
a weir disposed at said exit means of said contact device beneath said gas admittance and liquid discharge means;
a downcomer structure secured to and outside of said conduit and having a lower end connected with said throat means, an upper end disposed above said discharge means, and means for connecting said lower and upper ends of said downcomer structure; and
a wall enclosure disposed about said conduit and configured to form with said downcomer structure, said conduit and said contact device, a counter current reflux liquid and gas, 360° progressively redirected flow path;
said upper end of said downcomer structure is arranged to receive a liquid discharge from an exit means of a contact device of one of said other column sections next above said section in said vertical stack for 360° progressively redirected flow of said liquid discharge to the inlet means of said contact device;
said contact device of said one of said other column sections having an inlet means vertically aligned with the inlet means of said section;
so that the liquid flow from said inlet means to said exit means of said contact device is unidirectional relative to liquid flow across said contact device of said one of said other column sections next above said section in said vertical stack.

7. A vetical column for ascending vapors and countercurrent descending reflux liquid and froth, which comprises:
plural, mutually-spaced, vertically aligned, horizontal vapor and liquid contact devices, each provided with an outlet means;
conduit means connected to the outer periphery of and mounting said plural, vertically aligned contact devices for conducting vapor flow from one contact device to and through a next upper contact device;
a plurality of vertically aligned reflux liquid admittance throat means, each connected with an inlet means of one of said contact devices opposite said outlet means and;
each inlet means is vertically aligned with the inlet means of a next lower contact device in said vertical column; and
downcomer means, laterally disposed exterior of and secured to said conduit means, for conducting reflux liquid from the outlet means of each said contact devices to the admittance throat means connected with an inlet means of a next lower contact device to provde a 360° progressively redirected flow path from each admittance throat means to a verticaily aligned admittance throat means of said next lower contact device so that the liquid flow across each of said contact devices is unidirectional relative to the liquid flow across the plural devices.

4,872,956

METHODS OF MEASURING ION-CONCENTRATION AND THE LIKE AND A CALIBRATING SHEET AS WELL AS A CALIBRATING METHOD OF MEASURING DEVICES USED THEREIN

Haruo Kotani, and Katsuhiko Tomita, both of Miyanhohigashi, Japan, assignors to Horiba, Ltd., Kyoto, Japan

Continuation of Ser. No. 124,629, Nov. 24, 1987, abandoned. This application Dec. 29, 1988, Ser. No. 291,628
Claims priority, application Japan, Dec. 11, 1986, 61-296369; Mar. 16, 1987, 62-61634
Int. Cl.[4] A61B *10/00;* **G01N** *27/46*
U.S. Cl. 204—1 T **14 Claims**

1. A method of measuring characteristics of a sample based on the electrical properties of the sample, comprising the steps of:
impregnating an easily absorbing solution material with the sample, said sample being obtained from an object to be measured and said solution material being chemically stabilized, flexible, and said solution material emanating no interferential ingredient against the object to be measured; and
bringing said solution material into physical contact with a

measuring portion of a sheet-type ion-concentration device for measuring said characteristics, said sheet-type measuring device having an electrode which is formed in part by an ion-response membrane and further having a

reference electrode where both electrodes substantially lie in the same plane for placement of said solution material therebetween, the step of bringing following the step of impregnating.

4,872,957

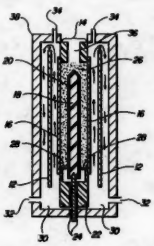
ELECTROCHEMICAL CELL HAVING DUAL PURPOSE ELECTRODE

Dennis F. Dong; Edward B. Noonan; Derek J. Rogers, all of Kingston; Arthur L. Clifford, Markham; Katharina Benesch, Kingston, all of Canada, and Richard E. Loftfield, Jacksonville, Fla., assignors to H-D Tech Inc., Woodbridge

Filed Jul. 20, 1988, Ser. No. 221,854

Int. Cl.[4] C25B *1/30, 11/03*

U.S. Cl. 204—84 **18 Claims**



17. A process for reacting a liquid with a gas in an electrochemical cell comprising at least one electrode assembly comprising an electrode characterized as porous and self-draining and at least two electrodes of oppposite charge to said porous and self-draining electrode, each electrode of opposite charge contained in an electrolyte compartment and separated by said electrode assembly and further comprising: an electrode frame defining an opening, said opening filled with said porous, self-draining electrode and containing an internally positioned current distributor and a liquid permeable, microporous diaphragm contacting the external faces of said electrode, said process comprising

(A) flowing a liquid electrolyte into said electrolyte compartment and recovering spent electrolyte from said electrolyte compartment and

(B) providing internal electrolyte flow within said electrolyte compartment.

4,872,958

ION EXCHANGE MEMBRANE FOR ELECTROLYSIS

Koji Suzuki, Yokohama; Tetsuro Tsukada, Machida; Yoshihiko Saito; Kiyotaka Arai, both of Yokohama, and Hiroshi Mori, Yokohama, all of Japan, assignors to Asahi Glass Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 59,770, Jun. 8, 1987, abandoned. This application Jun. 15, 1988, Ser. No. 206,914

Claims priority, application Japan, Jun. 13, 1986, 61-136217; Jun. 26, 1986, 61-148176; Jun. 27, 1986, 61-149682

Int. Cl.[4] C25B *1/16, 1/26, 13/08*

U.S. Cl. 204—98 **28 Claims**

1. An ion exchange membrane for electrolysis comprising a first layer having a thickness of from 5 to 50 μm of a fluoropolymer having carboxylic acid groups as the first layer's ion exchange groups and facing a cathode, a second layer having a thickness of from 50 to 200 μm of a fluoropolymer having ion exchange groups, a specific resistance lower than that of the first layer by at least 10 Ω.cm and a thickness of at least 50% of the total thickness of the membrane, and a third layer having a thickness of from 10 to 50 μm of a fluoropolymer having ion exchange groups, a swelling degree higher by at least 5% than that of the second layer and a specific resistance lower by at least 30 Ω.cm than that of the second layer, the first, second and third layers being laminated in this order.

15. An ion exchange membrane for electrolysis comprising a first layer having a thickness of from 5 to 50 μm of a fluoropolymer having carboxylic acid groups as the first layer's ion exchange groups and facing a cathode, a second layer having a thickness of from 50 to 200 μm of a fluoropolymer having ion exchange groups, a specific resistance lower by at least 10 Ω.cm than that of the first layer and a thickness of at least 50% of the total thickness of the membrane, a third layer having a thickness of from 5 to 50 μm of a fluoropolymer having ion exchange groups, a swelling degree higher by at least 5% than that of the second layer and a specific resistance lower by at least 30 Ω.cm than that of the second layer, and a fourth layer having a thickness of from 5 to 50 μm of a fluoropolymer having ion exchange groups and a specific resistance higher by from 5 to 150 Ω.cm than that of the third layer, the first, second, third and fourth layers being laminated in this order.

4,872,959

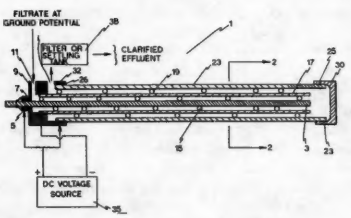
ELECTROLYTIC TREATMENT OF LIQUIDS

Robert J. Herbst, Parker, Colo., and Russell R. Renk, Laramie, Wyo., assignors to Cleanup & Recovery Corp. (CURE), Denver, Colo.

Continuation-in-part of Ser. No. 74,680, Jul. 17, 1982, abandoned, which is a continuation-in-part of Ser. No. 59,998, Jun. 9, 1987, abandoned. This application Sep. 30, 1987, Ser. No. 102,681

Int. Cl.[4] C25C *1/20*; C25F *5/00*; C25B *9/00*

U.S. Cl. 204—109 **48 Claims**



46. A method for removing gold from an aqueous material, which comprises said aqueous material containing said gold through an electrolytic treatment apparatus for liquids, comprising:

a centrally located elongated member for allowing said aqueous material to pass therealong;

an inner insulator means for wrapping around said centrally located elongated member and for allowing said aqueous material to pass along the external surface thereof;

an inner tube for enclosing said inner insulator means and for allowing said aqueous material to pass along the internal and external surfaces thereof;

an outer insulator means for wrapping around said inner tube and for allowing said aqueous material to pass along the external surface thereof;

an outer tube for enclosing said outer insulator means and for allowing said aqueous material to pass along the internal surface thereof;

a housing means having an inlet and outlet portions, whereby gold is recovered from said aqueous material.

4,872,960

PROTECTIVE COATINGS OF A CURED HYDROXYSTYRENE MANNICH BASE AND BLOCKED POLYISOCYANTES

Donna L. Keene, Carrollton, Va., and Darrell D. Hicks, Jeffersontown, Ky., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Filed Jul. 18, 1988, Ser. No. 219,695

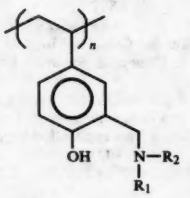
Int. Cl.[4] C08L *29/00*

U.S. Cl. 204—181.7 **21 Claims**

1. A coating composition which comprises a uniformly dispersed admixture of

A. a fluid carrier; and

B. a homopolymer or copolymer containing monomer units of the formula



wherein R_1 and R_2 are independently C_1 to C_{12} alkyl, or hydroxyalkyl, or aryl, wherein the comonomer is a substituted or unsubstituted component selected from the group consisting of styrene, acrylates, methacrylates and maleimides; said homopolymer or copolymer having a value of n which corresponds to an average molecular weight in the range of from about 360 to about 200,000; and

C. a polyisocyanate compound having terminal NCO units blocked with a blocking component, said blocking component selected to prevent unblocking from the NCO units prior to the application of conditions suitable to cause the reaction of NCO groups from said polyisocyanate compound with said homopolymer or copolymer.

21. A method of protecting a metallic surface which comprises cationically electrodepositing the composition of claim 1 onto said surface and curing the composition by heating wherein the fluid carrier is water or a water/co-solvent mixture.

4,872,961

CORROSION RESISTANT, LOW TEMPERATURE CURED CATHODIC ELECTRODEPOSITION COATING

John M. McIntyre; Kenneth W. Anderson; Nancy A. Rao, and Richard A. Hickner, all of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Aug. 28, 1987, Ser. No. 90,498

Int. Cl.[4] C05D *13/00*

U.S. Cl. 204—181.7 **48 Claims**

1. In a cathodic electrodepositable coating composition comprising an aqueous dispersion of (1) at least one cationic epoxy-based resin, (2) at least one blocked isocyanate crosslinker, and (3) a solvent system containing one or more organic solvents:

the improvement which comprises (a) employing a blocked isocyanate crosslinker which deblocks at a temperature of less than about 160° C., and (b) employing as the solvent system, one which is substantially free of any organic solvent which will react with isocyanate groups at the temperature employed to cure said coating.

4,872,962

PRINTING PRESS

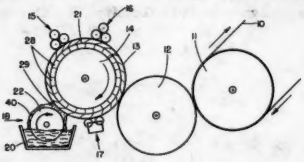
Wolfgang Scheer, Holzkirchen; Hartmut Fuhrmann, Karlsfeld; Gerhard Kossmehl, Berlin; Matthias Niemitz, Berlin, and Detlef Kabbeck-Kupijai, Berlin, all of Fed. Rep. of Germany, assignors to MAN Technologie GmbH, Munich, Fed. Rep. of Germany

Filed Dec. 18, 1987, Ser. No. 134,924

Claims priority, application Fed. Rep. of Germany, Feb. 20, 1987, 3705439

Int. Cl.[4] C25D *17/00*

U.S. Cl. 204—224 R **15 Claims**



1. A printing press for surface printing comprising a printed image carrier having hydrophobic and hydrophilic areas corresponding to matter to be printed, means for changing over areas of such printed image carrier between hydrophobic and hydrophilic states in dots, said printed image carrier comprising a material able to be changed between over between said states by electrical operation, and means adapted to produce electrical operating signals for influencing selected areas of said printed image carrier to effect such change in state thereat.

4,872,963

METHOD AND APPARATUS FOR IMPROVED ELECTROPLATING AND PAINTING RACKS

Samuel L. Van Horn, 2270 S. High St., Columbus, Ohio 43207

Continuation-in-part of Ser. No. 656,253, Oct. 1, 1984, Pat. No. 4,591,420, Continuation-in-part of Ser. No. 828,030, Feb. 10, 1986, abandoned. This application May 13, 1988, Ser. No. 193,560

Int. Cl.[4] C25D *17/08*; B05C *13/00*

U.S. Cl. 204—297 W **9 Claims**

1. A support rack for use in holding objects comprising:

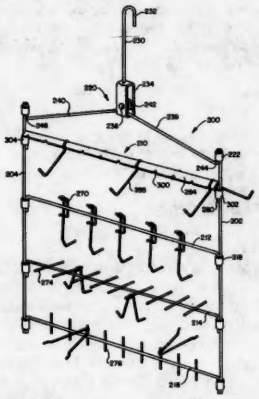
a first primary support rod having a length and two ends;

a second primary support rod having a length substantially equal to the length of said first primary support rod, spaced apart and parallel to said first primary support rod;

at least one cross support rod having a length, two ends and a diameter, having means for releasable connection to said

first and second primary support rods at the ends of said cross support rod;

a plurality of tip holding members each fixedly attached to said cross support rod, each tip holding member having a diameter and being configured to hold at least one releasably attached retaining tip, said objects being retained by said retaining tip;



wherein said means for releasable connection between said cross support rod and said first and second primary support rods comprises:

a cross support rod socket fixedly attached to and parallel to the length of said primary support rod, said socket being configured to the diameter of said cross support rod;

a 90 degree bend in an end of said cross support rod.

4,872,964

PLANAR MAGNETRON SPUTTERING APPARATUS AND ITS MAGNETIC SOURCE

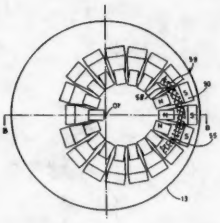
Masafumi Suzuki, Kawasaki, and Hidenobu Shirai, Seto, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 85,295, Aug. 13, 1987, abandoned, which is a continuation of Ser. No. 890,238, Jul. 29, 1986, abandoned. This application Aug. 26, 1988, Ser. No. 237,689

Claims priority, application Japan, Aug. 2, 1985, 60-171327

Int. Cl.[4] C25C *14/34*

U.S. Cl. 204—298 **9 Claims**



1. A planar magnetron sputtering apparatus utilizing a plasma formed by an electromagnetic field, said apparatus comprising:

an evacuable chamber having a means for introducing an inert gas and a means for holding a substrate for deposit;

a planar target within said chamber, a front face of said target faces in parallel with said substrate;

means for applying an electric field over the front surface of said target;

a mounting base; and

magnetic source means for generating a magnetic field over the surface of said target, said magnetic source means being positioned behind said target and being rotated around a center axis of said target, a plane of rotation being maintained in parallel with said target, said magnetic source means being composed of a plurality of permanent magnets arranged on said mounting base, each permanent magnet being arranged in a way that similar poles are toward said center axis, each permanent magnet being aligned in a direction of said rotation to form a closed contour having a distance from the center axis which gradually decreases and then increases, said closed contour forming a heart-shaped-like contour on said mounting base, each permanent magnet having a lateral width measured in a direction of said rotation, each lateral width, along the entire closed contour, being substantially proportional to a radius of rotation about said center axis, so that a plasma region is formed over the surface of said target, an instantaneous length of said plasma region, measured along an arc of said rotation, being proportional to a radius of rotation, wherein substantially all of the said surface of said target is exposed during the rotation of the magnetic source means to the plasma generated by said magnetic field for substantially the same period of time.

4,872,965

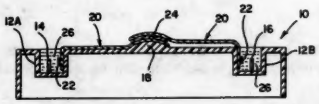
CONTACT LENS CLEANING APPARATUS

Mark L. Pankow, 2106 N. Seminary, Chicago, Ill. 60614

Filed Feb. 10, 1988, Ser. No. 154,790

Int. Cl.[4] B08B *3/12, 6/00, 7/00*

U.S. Cl. 204—299 R **17 Claims**



1. A lens cleaning apparatus comprising:

means for containing a fluid capable of transmitting an electrical charge;

means for supplying an electrical current to said fluid;

means for transmitting said electrical current from said fluid to a location remote from said fluid, said electrical transmitting means including an immersion end within said electrical charge transmitting fluid, said electrical transmitting means further being for transmitting the electrical current from said fluid to said remote location; and

at least said fluid containing means, said electrical current supplying means, and electrical current solely transmitting means cooperate to clean a lens positioned at said remote and exterior location.

4,872,966

SHEET TYPE ELECTRODE FOR USE IN THE MEASUREMENT OF ION CONCENTRATIONS

Haruo Kotani, and Katsuhiko Tomita, both of Kyoto, Japan, assignors to Horiba, Ltd., Kyoto, Japan

Filed Nov. 24, 1987, Ser. No. 124,970

Claims priority, application Japan, Dec. 11, 1986, 61-191497[U]

Int. Cl.[4] G01N *27/46*

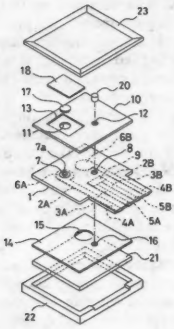
U.S. Cl. 204—414 **13 Claims**

1. In a sheet-configured electrode for use in the measurement of ion concentrations, the improvement comprising:

a substrate of a non-conducting material defining a through-hole;

an electrode assembly having a glass electrode disposed side

by side to a reference electrode, each electrode having a different internal construction from the other, the glass electrode being provided with an internal electrode portion directly aligned with said throughhole and a lead portion, said portions being adhered to a lower surface of



the substrate, the lower surface being opposite a side of the substrate from which a sample is received by the sheet-configured electrode, and

a support layer of non-conducting material formed over a portion of the electrode assembly while exposing the lead portion.

4,872,967

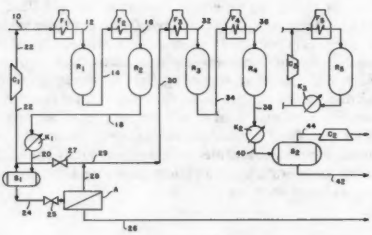
MULTISTAGE REFORMING WITH INTERSTAGE AROMATICS REMOVAL

Kenneth R. Clem, Baton Rouge, La.; Kenneth J. Heider, Oak Ridge; James E. Kegerreis, Montville, both of N.J., and Ehsan I. Shoukry, Baton Rouge, La., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed May 23, 1988, Ser. No. 197,233

Int. Cl.[4] C10G *35/06*

U.S. Cl. 208—65 **34 Claims**



1. A process for catalytically reforming a gasoline boiling range hydrocarbonaceous feedstock in the presence of hydrogen in a reforming process unit comprised of a plurality of serially connected reactors wherein each of the reactors contains a supported noble metal-containing reforming catalyst compositon, the process comprising:

(a) conducting the reforming it two or more stages comprised of one or more reactors;

(b) separating aromatics from at least a portion of the reaction stream between each stage thereby resulting in an aromatics-rich stream and an aromtics-lean stream;

(c) passing at least a portion of the aromatics-lean stream to the next downstream stage, in the substantial absence of non-reformed feed; and

(d) conducting the reforming of one or more of the downstream stages wherein at least one of the reactors contains a reforming catalyst selected from (i) a supported multimetallic catalyst wherein at least one of the metals is a noble metal, and the support is alumina, and (ii) a noble metal-containing catalyst wherein the support material is a crystalline aluminosilicate material, and wherein at least one downstream reactor is operated in the substantial absence of steam, and at a pressure which is at least 25 psig lower than that of the first stage.

4,872,968

CATALYTIC DEWAXING PROCESS USING BINDER-FREE CATALYST

Emmerson Bowes, East Amwell, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Aug. 20, 1987, Ser. No. 87,197

Int. Cl.[4] C10G *47/20*

U.S. Cl. 208—111 **5 Claims**

1. A process for catalytic dewaxing of a waxy feed having a pour point of at least 100° F., containing at least 25 wt % paraffin hydrocarbons and having a basic nitrogen content of at least 100 ppm by contacting the feed with a dewaxing catalyst comprising a binder-free extrudate of an intermediate pore zeolite at a temperature of 500° to 700° F. and at a space velocity, LHSV of 0.25 to 1.5 hr^{-1} and wherein said binder free extrudate zeolite catalyst displays an aging rate which is at least 65% lower than the aging rate of a comparable, alumina bound zeolite dewaxing catalyst of the prior art used at identical process conditions and recovering a dewaxed feed as a product of the process.

4,872,969

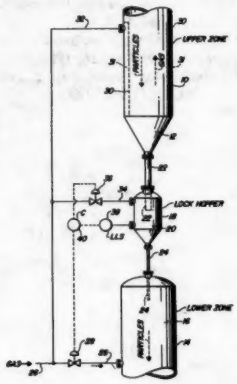
METHOD FOR VALVELESS CONTROL OF PARTICLE TRANSPORT

Paul A. Sechrist, Arlington Heights, Ill., assignor to UOP, Des Plaines, Ill.

Filed Mar. 28, 1988, Ser. No. 173,831

Int. Cl.[4] C10G *35/00*

U.S. Cl. 208—173 **5 Claims**



1. A method for semi-continuously transferring solid particles through an upper collection zone, an intermediate collection zone and a lower collection zone, said method comprising:

(a) passing particles from said upper zone to said intermediate zone through an upper transfer conduit, passing first gas stream into said lower zone, passing said first gas stream from said lower zone upwardly through a lower

transfer conduit into said intermediate zone, and passing said first gas stream from said intermediate zone upwardly through said upper transfer conduit into said upper zone, said upper conduit having a flow larger than the flow area of said lower conduit and said gas stream having a flux rate that will prevent particle movement down said lower transfer conduit and permit particle movement down said upper transfer conduit;

(b) passing a second gas stream into said intermediate zone to provide a gas flux rate up said upper transfer conduit that will prevent particle movement down said upper transfer conduit; and

(c) reducing the flow of said first gas stream into said lower zone and passing particles from said intermediate zone to said lower zone through said lower transfer conduit.

4,872,970

REACTIVATION OF IRIDIUM-CONTAINING CATALYSTS

Joseph P. Boyle, Sarnia, Canada, assignor to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Sep. 23, 1988, Ser. No. 248,512

Int. Cl.[4] C10G *35/09, 35/085;* **B01J** *23/96, 38/44*

U.S. Cl. 208—140 **32 Claims**

1. In a process for the catalytic conversion of hydrocarbons wherein a hydrocarbon feedstock is contacted with a catalyst containing an iridium component composited with a porous refractory inorganic oxide support at hydrocarbon conversion conditions, the catalyst having been at least partially deactivated during contact with the feedstock by coke deposition thereon, the catalyst having been regenerated after discontinuing contact of said catalyst with the feedstock in a series of steps which include

(i) providing a bed of the catalyst in a reaction zone wherein the catalyst has a chloride level of at least about 0.9 wt.%.

(ii) burning a major portion of the coke from the catalyst while adding a gas containing a chlorinated compound in an amount sufficient to maintain at least 0.9 wt.% chloride on the catalyst and oxygen in a concentration ranging up to about 5000 vppm to provide a flame front temperature not exceeding about 425° C.,

(iii) increasing the chloride level of the catalyst to at least about 1.6 wt.%,

(iv) burning a major portion of the remaining coke from the catalyst while adding a gas containing from about 100 to about 5000 vppm of a chlorinated compound and up to about 5000 vppm oxygen to provide a flame front temperature of at least about 460° C.,

the improvement comprising

(a) contacting the substantially coke-depleted catalyst with a gas containing from about 300 to about 10,000 vppm of a chlorinated compound and from about 0.3 to about 5 vol.% of oxygen at a temperature of at least about 460° C. under essentially stagnant gas conditions for at least about 1 hour, the concentrations of the chlorinated compound and oxygen during this contacting being greater than the concentrations used in (iv), and

(b) repeating (a) at least two additional times to redisperse the agglomerated iridium, thereby obtaining a substantially coke-depleted and reactivated iridium-containing catalyst.

4,872,971

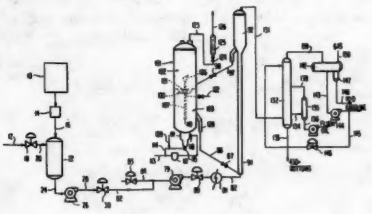
PROGRESSIVE FLOW CRACKING OF COAL/OIL MIXTURES WITH HIGH METALS CONTENT CATALYST

Oliver J. Zandona, Ashland, Ky., assignor to Ashland Oil, Inc., Ashland, Ky.

Continuation of Ser. No. 292,098, Jul. 30, 1981, abandoned. This application Sep. 4, 1984, Ser. No. 646,404

Int. Cl.[4] C10G *1/06*

U.S. Cl. 208—419 **21 Claims**



1. A process for economically producing liquid fuel products at least partly from coal, comprising the steps of:

A. introducing to a progressive flow catalytic cracking zone a charge stock comprising a pumpable mixture of solid, particulate coal and carbo-metallic oil, at least about 70% of said oil boiling above about 650° F., the weight ratio of oil to coal being at least 1:1, said carbo-metallic oil being characterized by a carbon residue on pyrolysis as defined by a Conradson carbon content in the range of 2 to about 12 wt.% carbon by ASTM D189-76 and by containing at least about 4 ppm nickel equivalents of heavy metal(s), said metals including nickel, and forming within said zone a stream having a linear velocity of at least about 25 feet per second, said stream comprising said charge stock and a hydrocarbon zeolite cracking catalyst, said zeolite catalyst being characerized as bearing a deposit of heavy metal(s) of at least about 1500 ppm nickel equivalents, for promoting dehydrogenation of said charge stock;

B. forming mobile hydrogen within said zone by said dehydrogenation under a combination of vapor residence time in the range of up to about 10 seconds, a temperature in the range of about 900°–1400° F. and a total pressure in the range of about 10 to about 50 pounds per square inch absolute;

C. introducing said moble hydrogen into said stream by dehydrogenation of said charge stock in the absence of added molecular hydrogen, through contacting said charge stock with said hydrocarbon zeolite cracking catalyst, thereby producing liquid products from said charge stock while laying down coke on said hydrocarbon cracking catalyst in the range of about 0.3% to about 3%, and thereby producing spent catalyst;

D. separating from said spent catalyst said liquid products.

4,872,972

APPARATUS FOR CLASSIFYING PARTICLES

Minoru Wakabayashi, Hyogo; Hiroyuki Murata; Yasuo Sugino, both of Kobe; Masanobu Yamao, Hyogo, and Takao Nishikawa, Kobe, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Nov. 5, 1987, Ser. No. 116,964

Claims priority, application Japan, Nov. 6, 1986, 61-264790; Nov. 6, 1986, 61-264791

Int. Cl.[4] B07B *7/04*

U.S. Cl. 209—143 **8 Claims**

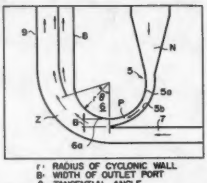
1. An apparatus for classifying particles, said apparatus comprising:

(a) a feed nozzle having an outlet port defined by a first side wall and a second side wall spaced from and at least ap-

proximately equidistant from said first side wall for producing a first jet stream of particles entrained in a gas;

(b) a cyclonic block disposed downstream of and continuous to said first side wall of said feed nozzle, said cyclonic block having a first inner arcuate surface sized, shaped, and positioned such that, in use, the first jet stream flows therealong;

(c) a control port sized, shaped, the positioned to produced a second jet stream of a gas that merges tangentially with the first jet stream adjacent said cyclonic block but on the side thereof remote from said cyclonic block to accelerate the first jet stream, said control port being defined by a first straight, imperforate side wall the merges tangentially



with said second side wall and a second straight, imperforate side wall that is spaced from and at least approximately parallel to said first straight, imperforate side wall; and

(d) at least two collecting ports disposed downstream of said cyclonic block in position to receive portions of the merged first and second jet streams,

wherein:

(e) said cyclonic block has a second inner arcuate surface sized, shaped, and positioned such that, in use, the first jet stream flows therealong and

(f) said second inner arcuate surface is located upstream of said first inner arcuate surface and upstream of said control port.

4,872,973

CYCLONE CLASSIFIER

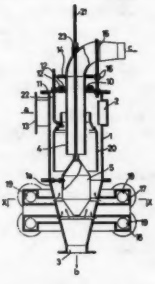
Iwao Ikebuchi, Hirakata; Mamoru Nakano, Kadoma; Kazuo Fuse, Nara, and Akira Ganze, Tokyo, all of Japan, assignors to Kubota Ltd., Osaka, Japan

Continuation of Ser. No. 51,373, May 19, 1987, abandoned. This application Feb. 23, 1989, Ser. No. 315,237

Claims priority, application Japan, Apr. 6, 1987, 62-51883[U]

Int. Cl.[4] B04C *3/00*

U.S. Cl. 209—144 **10 Claims**



1. A cyclone classifier comprising:

a tubular casing having upper, middle, and lower parts, said tubular casing including a peripheral wall defining an inside and an outside, and said lower part of said tubular casing including a substantially conical portion;

an inlet pipe means at said upper part of said tubular casing for supplying gas and material to be processed into the inside of said casing, said inlet pipe means having an inlet port means for directing the material to be processed into said casing and in a direction tangential to said peripheral wall of said casing;

a discharge pipe means for discharging solid particles and being at said lower part of said tubular casing;

an outlet pipe means for discharging gas and classified material from the inside or said tubular casing, said outlet pipe means extending from inside said casing, through said upper part of said casing, and outside said casing, said outlet pipe means having a first opening inside said casing and a second opening outs de said casing;

a tubular body having upper, middle, and lower parts, said tubular body including a peripheral wall defining an inside and an outside, said lower part of said tubular body being open and surrounding and extending past said first opening of said outlet pipe means, and said peripheral wall of said tubular body being spaced from said peripheral wall of said tubular casing for defining a space for further directing the material to be processed directed by said inlet port means of said inlet pipe means in a direction tangential to said peripheral wall of said casing;

a conic being attached to said casing, located inside said casing, being spaced from said peripheral wall of said casing, being spaced from said tubular body, and being spaced from said first opening of said outlet pipe means, said conic having substantially conical upper and lower ends, and being located between said first opening of said outlet pipe means and said discharge pipe means; and

an annular gas inlet pipe means substantially surrounding said peripheral wall of said lower part of said tubular Casing, said annular gas inlet means having an inner and an outer annular peripheral wall, a gas inlet port in said outer peripheral wall for introducing gas into said annular gas inlet pipe means in a direction tangential to said annular peripheral walls thereof for causing a smooth swirling tangential gas current there±n, a gas outlet port in said inner peripheral wall of said annular gas inlet pipe means, said gas outlet port extending around substantially the entire inner peripheral wall for fluidly communicating with said lower part of said tubular casing substantially around the entire circumference thereof for causing a smooth swirling tangential gas current in said tubular casing.

4,872,974

APPARATUS FOR TESTING MEMBRANE FILTERS, AND FOR STERILIZING LIQUIDS WITH USE OF MEMBRANE FILTER

Shigemitsu Hirayama, Yao; Takamichi Akashi, Ikeda; Akio Ikuta, Osaka; Isao Sasaki, Minoo, and Hiroshi Fukuda, Tokyo,, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Continuation of Ser. No. 45,159, May 4, 1987, abandoned, which is a continuation of Ser. No. 647,886, Sep. 6, 1984, abandoned. This application Dec. 27, 1988, Ser. No. 291,395

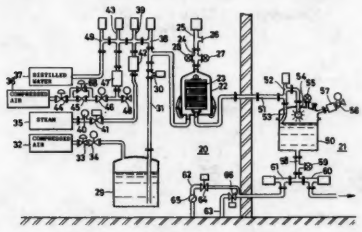
Claims priority, application Japan, Sep. 9, 1983, 58-167343; Mar. 19, 1984, 59-53259

Int. Cl.[4] G01N *15/08;* **B01D** *13/00*

U.S. Cl. 210—90 **2 Claims**

1. A liquid sterilizing filtration apparatus comprising a filter housing fixedly accommodating a membrane filter therein, a primary container for containing a prefilt, a primary pipe connecting the primary side of the filter housing to the primary container, means defining a gas source connected to the primary pipe, a secondary container for containing a filtrate, and a secondary pipe connecting the secondary side of the filter housing to the secondary container, the apparatus further including means defining a steam source and a distilled water

source which are connected to the primary pipe via a changeover valve, a valve which sets pressure increase rate being provided between the gas source and the changeover valve for maintaining the rate of increase of the pressure at the primary side of the membrane filter by the gas at a predetermined value, a gas outlet being provided at an upper portion of the filter housing and openable by a value, a pressure sensor being provided at the primary side of the filter housing, and a control unit comprising a microcomputer structured to achieve automatic control of sterilization, filtration, membrane perfection testing, and removal of air from the filter housing, said control unit including means for opening and closing said valves in response to said pressure sensor, and said control unit being designed in such manner that the acceptability of the membrane filter is automatically judged as to its perfection by evaluating whether the pressure at the primary side of the membrane filter is within a specified judging range at a predetermined time after the start of increase of the pressure at the primary side of the membrane filter by the gas.

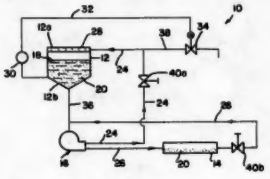


4,872,975

SYSTEM FOR SEPARATING ABRASIVE MATERIAL FROM A FLUID USED IN FLUID JET CUTTING

Dan T. Benson, Joplin, Mo., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Jan. 31, 1989, Ser. No. 304,084
Int. Cl.[4] B01D *21/26, 21/34;* **B24C** *9/00*
U.S. Cl. 210—99 **11 Claims**



9. A system for separating abrasive material from a fluid used in fluid jet cutting, comprising:

a catcher tank;

means for pumping fluid, having an abrasive material suspended therein, from the catcher tank and centrifugally separating an abrasive slurry from the fluid;

first conduit means for returning the fluid separated from the slurry to the catcher tank;

a settling tank;

second conduit means for directing the slurry to the settling tank wherein a portion of the abrasive material substantially settles from the slurry and, after settling has occurred, the slurry from which some of the abrasive material has settled is returned to the means for pumping;

fluid level control means for limiting fluid in the catcher tank to a desired level; and

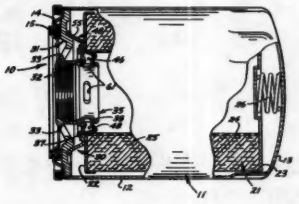
means for regulating fluid flow rate in the system.

4,872,976

OIL FILTER WITH MULTIPLE FUNCTION VALVE

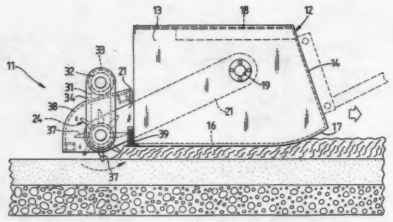
Roger L. Cudaback, Gibbon, Nebr., assignor to Baldwin Filters, Inc., Kearney, Nebr.

Filed Jul. 25, 1988, Ser. No. 223,395
Int. Cl.[4] B01D *27/10*
U.S. Cl. 210—130 **11 Claims**



1. An oil filter comprising a housing, a filter element located in said housing and operable to separate contaminants from oil passing through said element, a plate joined to one end of said housing, a series of angularly spaced inlet openings formed through said plate for admitting oil into said housing, a sleeve joined to said plate near the center thereof and defining an outlet for discharging oil from said housing, oil normally flowing from said inlet openings, through said filter element and out of said outlet when said inlet is pressurized, and valve means for controlling the flow of oil between said inlet openings and said outlet, said valve means comprising a flange projecting radially outwardly from said sleeve and having angularly spaced passages which are operable when open to allow oil to flow directly from said inlet openings to said outlet without passing through said filter element, a valve member comprising a ring made of resiliently yieldable material and telescoped over said sleeve, said valve member having an inner peripheral portion defining a first resiliently yieldable valve portion normally biased fact-to-face against said flange and normally closing said passages to prevent oil from flowing directly from said inlet openings to said outlet, said valve member having a second resiliently yieldable valve portion biased to a closed position against said plate and operable when in said closed position to prevent oil from flowing between said inlet openings and said filter element, said valve member further including an intermediate section disposed in a generally radial plane, said first valve portion normally lying in said plane and being hinged to said intermediate section to yield and swing out of said plane to open said passages, and said second valve portion comprising a skirt extending around and projecting generally axially from the outer periphery of said intermediate section and hinged to yield and swing toward said plane, said second valve portion normally yielding when said inlet openings are pressurized and permitting oil to flow from said inlet openings to said outlet by way of said filter element, and said first valve portion yielding and opening said passages when said inlet openings are pressurized and the pressure differential between said inlet openings and the downstream side of said filter element exceeds a predetermined value whereby oil bypasses said filter element and flows directly from said inlet openings to said outlet by way of said passages, there being a series of angularly spaced and generally radially extending ports formed through said sleeve and communicating with said passages when said first portion of said valve member yields and opens said passages.

4,872,977
SOLID WASTE RETRIEVER
Davis G. Jackson, 3927 Lorna Rd., Birmingham, Ala. 35244
Filed Sep. 26, 1988, Ser. No. 249,412
Int. Cl.[4] B07B *1/00*; E02F *3/40*
U.S. Cl. 210—173 **14 Claims**



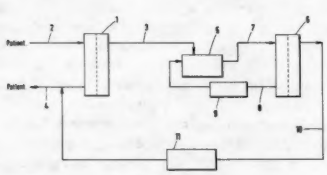
8. Apparatus for removing dried sludge from an underlying sand bed when urged thereacross by an associated propelling device comprising:

(a) a sludge receiving bin having a smooth imperforate bottom surface adapted to slide over said sludge with minimal resistance such that dried sludge forward of said bin is not disrupted as said receiving bin is urged thereacross, said sludge a closed forward end with a rolled radius curved section and

(b) a rotor assembly mounted for selective positioning adjacent said open rear end for lifting dried sludge emerging from below said bin thereinto; and

(c) a propelling device operatively connected to said bin.

4,872,978
DEVICE FOR THE REMOVAL OF CRYOGLOBULINS
Storker Jorstad, Trondhjem, Norway, and Leif Smedby, Lund, Sweden, assignors to Fabio Fasting Biotech A/S, Trondhjem, Norway
Filed Nov. 25, 1987, Ser. No. 125,419
Claims priority, application Norway, Nov. 26, 1986, 864728
Int. Cl.[4] B01D *35/18, 36/02, 36/04*
U.S. Cl. 210—181 **14 Claims**



1. A device for the cryoprecipitation of blood plasma, said device comprising:

a plasma separator for the separation of blood cells from blood plasma in blood from a mammal,

a sedimentation container,

a first tube connecting said plasma separator and said sedimentation container,

a plasma filter,

a second tube connecting said plasma filter and said sedimentation container, for the supply of blood plasma from said plasma separator to said plasma filter,

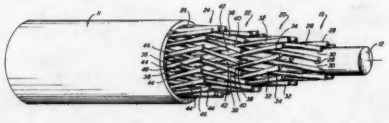
an outlet tube from said plasma filter for flow of filtrate from said plasma filter for return to a host,

a heating device for the filtrate flowing through said outlet tube,

a recirculation tube connected to said plasma filter and said sedimentation container for recirculating plasma from said plasma filter back to said plasma filter through said sedimentation container and said second tube,

a cooling device for said recirculation tube for cooling the recirculating plasma between said plasma filter and said sedimentation container.

4,872,979
CHROMATOGRAPHY COLUMN
Marcel Golay, La Conversion, Switzerland, assignor to The Perkin-Elmer Corporation, Norwalk, Conn.
Filed Apr. 22, 1987, Ser. No. 41,554
Int. Cl.[4] B01D *15/08*
U.S. Cl. 210—198.2 **28 Claims**



1. A chromatographic column comprising

an elongated column housing having first and second end portions,

an elongated central core element within said housing extending between said first and second end portions,

a configuration of fiber layers disposed about said central element forming a plurality of fluid passageways extending between said first and second end portions, said configuration comprising,

an innermost layer having a plurality of fibers helically wound about said central element with the fibers being in predetermined spaced disposition for forming uniform fluid passageways between adjacent fibers extending between said first and second end portions, and

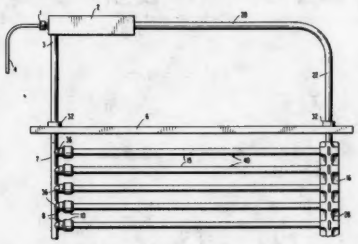
a plurality of outwardly successive layers of fibers disposed about said innermost layer with an outermost layer being disposed adjacent said housing, each said successive layer having a plurality of fibers helically wound in reverse hand relative to the next adjacent layer and in predetermined spaced disposition for forming uniform fluid passageways between adjacent fibers extending between said first and second end portions with a plurality of lateral openings fluidly interconnecting overlapping fluid passageways longitudinally along said passageways, and

a chromatographic coating of stationary phase material on said passageways.

4,872,980
FLUID PURIFICATION DEVICE
Jan Maarschalkerweerd, Lambeth, Canada, assignor to Trojan Technologies, Inc., Canada
Filed Sep. 13, 1988, Ser. No. 243,845
Int. Cl.[4] G01N *21/01*
U.S. Cl. 210—243 **35 Claims**

1. A fluid purification device comprising in combination a frame including a pair of opposed legs laterally spaced from each other, one of said legs having a longitudinally extending passage therein, a plurality of water purification lamp assemblies extending between and supported by said legs, each lamp assembly having one end thereof located towards said one leg and an opposite end located towards the other leg, a plurality of electrical lead wires located in said passage in said one leg and respectively connected to said lamp assemblies at said one end thereof, said one leg having a plurality of openings spaced along said one leg, a plurality of first seals surrounding said lead wires and respectively sealing said openings from the

fluid, electrical connector means connecting said lead wires to said lamp assemblies respectively while being sealed to prevent



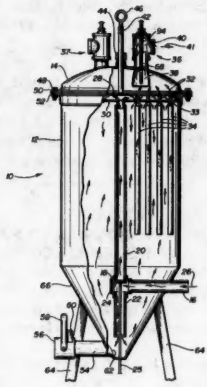
contact with fluid surrounding said lamp assemblies when in use, and wherein said other leg is free of any lead wires.

4,872,981

SPLIT INLET FOR FILTER

Russell Hobson, Jr., Rte. 1, Box 30, Old Fort, N.C. 28762

Filed Jan. 7, 1988, Ser. No. 141,651
Int. Cl.[4] B01D *29/24*
U.S. Cl. 210—323.2 **18 Claims**



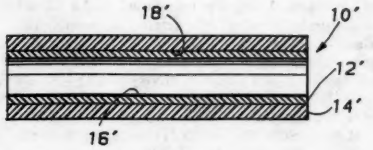
1. A fluid filter, comprising:
a casing;
a tube sheet dividing said casing into a filtered and an unfiltered chamber, said tube sheet having openings therethrough;
a filter unit in each of said openings in said tube sheet;
a filtered fluid outlet in said filtered chamber;
fluid inlet means in said unfiltered chamber for directing the flow of fluid, toward said filtered chamber, and away from said filtered chamber and, wherein said fluid inlet means is comprised of a valve means for directing the flow of fluid towards said filtered and said unfiltered chamber.

4,872,982

COMPOSITE SEMIPERMEABLE MEMBRANES AND METHOD OF MAKING SAME

John A. Taylor, Pinckney, Mich., assignor to Separation Dynamics, Inc., Southfield, Mich.

Filed Sep. 6, 1988, Ser. No. 240,632
Int. Cl.[4] B01D *13/00*
U.S. Cl. 210—490 **14 Claims**



10. A semipermeable hollow fiber membrane consisting of:
a first layer including water and water soluble substance permeating means for selectively permeating only water and water soluble substances therethrough and excluding the permeation of hydrocarbon fluids; a second layer (**14**) covalently bonded to said first layer (**12**) and including water soluble substance permeating means for selectively permeating only water soluble substances therethrough and excluding water permeation therethrough.

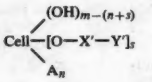
4,872,983

BIOCOMPATIBLE CELLULOSE DIALYSIS MEMBRANE WITH INCREASED ADSORPTION OF BETA-2-MICROGLOBULIN

Michael Dimantoglou, Erlenbach/Main, and Helmut Kuhne, Kreuzau, both of Fed. Rep. of Germany, assignors to Akzo N.V., Netherlands

Filed Dec. 9, 1988, Ser. No. 281,762
Claims priority, application Fed. Rep. of Germany, Dec. 11, 1987, 3742072
Int. Cl.[4] B01D *13/00*
U.S. Cl. 210—500.29 **11 Claims**

1. A dialysis membrane for hemodialysis in the form of flat films, tubular films or hollow filaments, composed of substitution-modified cellulose, wherein the modified cellulose has a molecular structure which substantially adsorbs beta-2-microglobulin present in blood plasma and is effective to reduce carpal tunnel syndrome and is represented by the formula



wherein:
Cell is a framework of an unmodified cellulose molecule or of a chitin molecule, in each case without hydroxyl groups;
A is selected from the group consisting of
and Z–B;
Z is an atom of group V or VI or the Periodic System other than oxygen;
In the case where Z is an atom of group V, A is
and T is a hydrogen atom or (X–Y); in the case where Z is an atom of group VI, A is
(n+s) is the mean degree of substitution; $0<n<m$ and $0 \leqq s<m$ and $n+s<m$;
m=3 in the case of the unmodified cellulose molecule and m=2 in the case of the chitin molecule;
B is selected from the group consisting of Y and X–Y;
—X— and —X'— are each at least one member selected

from the group consisting of a substituted or unsubstituted, straight or branched chain alkylene, alkenylene or alkynylene radical in which the carbon chain may be interrupted by hetero atoms or be CO—, CONR— or COO—groups, a substituted or unsubstituted cycloalkylene which may contain hetero atoms, a substituted or unsubstituted arylene, arylalkylene, arylalkenylene or arylalkynlene radical which may contain hetero atoms, a substituted or unsubstituted bisarylalkylene or bisarylene radical, a substituted bisarylalkylene or bisarylene radical of a condensed aromatic compound, and a substituted or unsubstituted readical of a heterocylic compound;

—Y and —Y' are each at least one member selected from the group consisting of —H, $—NR_2$ $—N^+R_3$, —COOH or a salt thereof, —COOR, $—CONR_2$, —CO—R, —CS—R, —CSOH or a salt thereof, —CSOR, $—CSNR_2$, $—SO_3H$ or a salt thereof, $—SO_3R$, $—SO_2R$, $—SO_2NR_2$, —SR, —SOR, —SON R_2, $—PO_3H_2$ or a salt thereof, —PO-$(OR)_2$, $—PO_2H(NR_2)$, $—PO(NR_2)_2$, $—PO_2H_2$, —PO-H(OR), —CN, $—NO_2$, —OR, halogen and $Si(OR)_3$;

R is at least one member selected from the group consisting of a hydrogen atom, a straight or branched chain alkyl, alkenyl or alkynyl group having 1 to 36 atoms in which the carbon chain may be interrupted by hetero atoms or by CO—, CONR— or COO— groups, a substituted or unsubstituted cycloalkyl group which may contain hetero atoms, a substituted or unsubstituted aryl, arylalkyl, arylalkenyl or arylalkynyl radical which may contain hetero atoms, a substituted or unsubstituted bisarylalkyl or bisaryl radical, a substituted or unsubstituted radical or a condensed aromatic compound, and a substituted or unsubstituted radical of a heterocyclic compound;

X is identical to or different from X' and Y is identical to or different from Y'.

4,872,984

INTERFACIALLY SYNTHESIZED REVERSE OSMOSIS MEMBRANE CONTAINING AN AMINE SALT AND PROCESSES FOR PREPARING THE SAME

John E. Tomaschke, San Diego, Calif., assignor to Hydranautics Corporation, San Diego, Calif.

Filed Sep. 28, 1988, Ser. No. 250,190
Int. Cl.[4] B01D *13/00*
U.S. Cl. 210—500.38 **58 Claims**

1. A water permeable membrane prepared by interfacially polymerizing, on a microporous support, (1) an essentially monomeric, aromatic polyamine reactant having at least two amine functional groups, and (2) an essentially monomeric, aromatic, amine-reactive reactant comprising a polyfunctional acyl halide or mixture thereof, wherein the amine-reactive reactant has, on the average, at least about 2.2 acyl halide groups per reactant molecule, in the presence of (3) a monomeric amine salt.

30. A process for producing a water permeable membrane comprising interfacially polymerizing, on a microporous support, (1) an essentially monomeric, aromatic polyamine reactant having at least two amine functional groups, and (2) an essentially monomeric, aromatic, amine-reactive reactant comprising a polyfunctional acyl halide or mixture thereof, wherein the amine-reactive reactant has, on the average, at least about 2.2 acyl halide groups per reactant molecule, in the presence of (3) a monomeric amine salt.

4,872,985

METHOD FOR APPLICATION OF WASTEWATER TO PLANTS FOR IMPROVED WASTEWATER TREATMENT

Ray Dinges, 3404 Buckrace, Austin, Tex. 78748

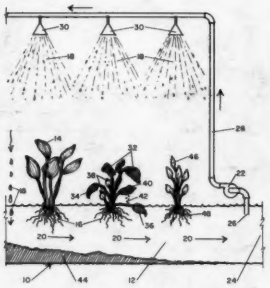
Filed Nov. 10, 1986, Ser. No. 928,996
Int. Cl.[4] C02F *3/32*
U.S. Cl. 210—602 **4 Claims**

1. A method of wastewater treatment comprising the steps of:

(a) constructing a wastewater treatment basin for temporarily holding wastewater introduced at one end and released at another end of said basin;

(b) growing floating aquatic plants in said basin;

(c) locating a pump means near the end of said basin where said wastewater is released; and



(d) providing an attaching means, interconnecting said pump, with a plurality of clog-free distribution means, and introducing said wastewater at variable rates and for variable time periods to said plants from above thereby engaging said wastewater with microbial biofilm covering leaves and stems, as well as the root mass, of said plants in purification of said wastewater.

4,872,986

USE OF BACTERIA FOR CONTROL OF ALGAL BLOOM IN WASTEWATER, LAGOONS, OR PONDS

William T. Stringfellow, Atlanta, Ga.; Charles D. Goldsmith, Christiansburg, and Lois T. Davis, Salem, both of Va., assignors to Sybron Chemicals, Inc., Birmingham, N.J.

Filed May 6, 1988, Ser. No. 191,073
Int. Cl.[4] C02F *1/50*
U.S. Cl. 210—611 **4 Claims**

1. A process for controlling algal growth in waste water, lagoons and ponds which comprises treating the algae containing water with a high concentration of a selected actively growing species of pseudomonas product which produces an exudate which exhibits antialgal characteristics.

4,872,987

PROCESS FOR SEPARATING AND PRODUCING CHLOROGENIC ACID

Reiner Kopsch, Schenefeld; Claus F. Gösswein, Buchholz; Henning Lutz; Michael Ball, both of Halstenbek, and Peter Hubert, Buxtehude, all of Fed. Rep. of Germany, assignors to Ergo Forschungsgesellschaft mbH, Hamburg, Fed. Rep. of Germany

Continuation of Ser. No. 131,191, Oct. 1, 1987, abandoned. This application Mar. 20, 1989, Ser. No. 326,488
Claims priority, application Fed. Rep. of Germany, Feb. 6, 1986, 3603574
Int. Cl.[4] B01D *15/08*
U.S. Cl. 210—635 **8 Claims**

1. A process for separation and production of 3-, 4-, and 5-chlorogenic acid by extraction of plant raw materials in water comprising passing a water extract from plant raw material containing chlorogenic acid through a chromatography column containing crosslinked dextran whereby the chlorogenic acid is separated from accompanying substances by gel permeation chromatography on said cross-linked dextran and eluting said chlorogenic acid with water as elution medium to obtain a purity of greater than 70.7% in commercial scale amounts.

4,872,988

METHOD AND DEVICE FOR SEPARATION OF COLLOIDAL SUSPENSIONS

Joseph B. Culkin, 2810 Clay St., Alameda, Calif. 94501

Filed Feb. 2, 1988, Ser. No. 151,359
Int. Cl.[4] B01D *13/00*
U.S. Cl. 210—636 34 Claims

1. A method for separating particulates from a colloidal suspension in which plugging of a filter membrane is inhibited said method comprising:

inhibiting plugging of a membrane from a sample blood suspension, by passing the suspension through the filter membrane, the filter membrane selected to substantially block passage of the particulates; and

simultaneously inducing a relative oscillation between the filter membrane and the suspension with a frequency and displacement selected to provide a Reynold's number of at least about 1.

4,872,989

SELECTIVE REMOVAL OF NITRATE IONS FROM SALT SOLUTIONS

Marico G. Pirotta, Paris, France, assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed Mar. 16, 1987, Ser. No. 26,079
Int. Cl.[4] B01D *11/04*
U.S. Cl. 210—638 13 Claims

1. A process for selectively removing nitrate ions from an aqueous solution containing one or more dissolved salts, including at least about 1% by weight of a chloride salt, based on the total weight of the solution, which comprises contacting the aqueous solution, under conditions of high kinetics, with a water-insoluble, hydrophobic-solvent-soluble, amine-group-containing material, and subsequently separating the aqueous solution from the amine-group-containing material.

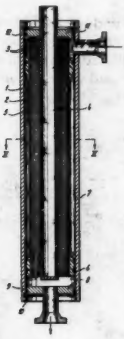
4,872,990

MEMBRANE MODULE FOR HYPERFILTRATION OR ULTRAFILTRATION OF CONTAINATING LIQUID FLOWS

Hendrik F. Van Wijk, Ce Zeist, Netherlands, assignor to Nederlandse Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek TNO, The Hague, Netherlands

Filed Sep. 9, 1988, Ser. No. 242,721
Claims priority, application Netherlands, Sep. 9, 1987, 8702149
Int. Cl.[4] B01D *13/00*
U.S. Cl. 210—644 18 Claims

1. Membrane module comprising: means for hyperfiltration or ultrafiltration of particulate-containing liquid flows including an envelope of membrane layers spirally wound around a tube provided with openings, said membrane layers being alternately separated by retentate spacers and permeate spacers, said retentate spacers comprising relatively rigid rods or wires extending parallel to the center line of said module, the width dimension of said rods measured perpendicular to said membrane layers being about 0.5 to 2.5 mm and the distance



between said rods being about four to about twelve times said width dimension.

4,872,991

TREATMENT OF WATER

Craig R. Bartels; Tansukhlal G. Dorawala, both of Wappingers Falls, N.Y.; Michael T. Stephenson, Katy, Tex.; Mordechai Pasternak, Spring Valley, and John Reale, Jr., Wappingers Falls, both of N.Y., assignors to Texaco Inc., White Plains, N.Y.

Filed Jul. 5, 1988, Ser. No. 214,981
Int. Cl.[4] B01D *13/00*; C02F *1/40*
U.S. Cl. 210—651 17 Claims

16. The method of treating an aqueous charge containing immiscible crude oil which comprises

nanofiltering said aqueous charge containing immiscible crude oil thereby forming (i) aqueous filtrate containing a diminished amount of immiscible crude oil and (ii) aqueous retentate containing immiscible crude oil;

recovering said aqueous filtrate containing a diminished amount of immiscible crude oil; and

recovering said aqueous retentate containing immiscible crude oil.

4,872,992

METHOD AND APPARATUS FOR ANALYZING DILUTED AND UNDILUTED FLUID SAMPLES

Javier N. Oquendo, Denton, and Joseph A. Leone, Plano, both of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Dec. 9, 1987, Ser. No. 130,831
Int. Cl.[4] B01D *15/08*
U.S. Cl. 210—659 5 Claims

1. A method for the simultaneous analysis of diluted and undiluted fluid samples to determine the concentration of one or more ions in said fluid samples, respectively, comprising the steps of:

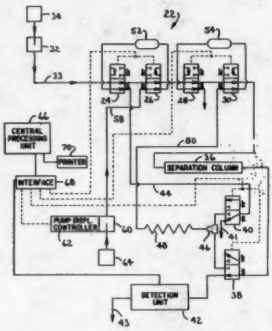
providing analysis means including an ion detection unit, ion separation means adapted to be in communication with said detection unit, first pump means for supplying an eluent for displacing a fluid sample to be measured through said separation means and said detection unit, second pump means for supplying an undiluted sample of fluid to be analyzed to said separation means and said detection unit, first reservoir means for holding a predetermined quantity of an undiluted sample of said fluid, second reservoir means for holding a predetermined quantity of a diluted sample of said fluid and valve means for selectively placing said reservoir means, respectively, in

flow communication with said separation means and said first pump means;

filling said first reservoir means with an undiluted fluid sample;

mixing a quantity of undiluted fluid with a diluent to form a diluted sample of fluid and filling said second reservoir means with said diluted sample of fluid;

selectively operating said valve means to displace one of said



samples of fluid through said separation means and said detection unit and followed by the other sample of fluid to be displaced through said separation means and said detection unit in timed relationship such that the concentration of the most concentrated component of said fluid sample and said least concentrated component of said fluid sample may be detected within a predetermined time period to provide an analysis of the components of said fluid sample by said detection unit.

4,872,993

WASTE TREATMENT

George C. Harrison, 32 Mid Oaks La., Roseville, Minn. 55113

Filed Feb. 24, 1988, Ser. No. 159,688
Int. Cl.[4] C02F *1/28*
U.S. Cl. 210—666 12 Claims

1. A process for treatment of waste water comprising the steps of:

(a) mixing with said waste water a finely-divided clay to form a blend, wherein said waste water includes organic matter and heavy metals;

(b) adding a flocculant to said blend in a manner such that said clay bonds to said flocculant to form a sludge;

(c) separating said sludge from said water;

(d) reducing water content of said sludge to less than about 60% by weight;

(e) shaping said sludge to form particles of desired size and shape;

(f) firing said sludge particles at a temperature of about 2,000 ° F. for a time sufficient to convert said sludge particles to expanded ceramic particles.

4,872,994

METHOD AND APPARATUS FOR REMOVING ORGANIC LIQUIDS FROM WATER

Paul G. Jakob, 7201 Venetion Way, West Palm Beach, Fla. 33406

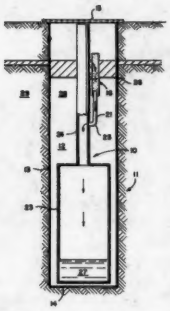
Filed Mar. 28, 1988, Ser. No. 174,459
Int. Cl.[4] B01D *17/022*
U.S. Cl. 210—691 6 Claims

1. A process for separating gasoline from water in a water well wherein an interface separates the gasoline from the water, comprising the steps of:

disposing a containment vessel in a water well below an interface of gasoline and water;

placing a floating wick vertically through the interface, said wick being hydrophobic, and absorbing said gasoline with said wick;

connecting said wick in open communication with the water well above the containment vessel;



permitting the absorbed gasoline to flow by gravity from said wick to said containment vessel for collection therein;

removing the collected gasoline from said containment vessel; and

venting said containment vessel to the atmosphere to displace gases in said containment vessel to the atmosphere.

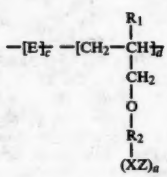
4,872,995

METHOD FOR CALCIUM OXALATE SCALE CONTROL

Fu Chen, Newtown, Pa., and Daniel L. Michalopoulos, Jacksonville, Fla., assignors to Betz Laboratories, Inc., Trevose, Pa.

Continuation-in-part of Ser. No. 37,484, Apr. 13, 1987, Pat. No. 4,759,851, which is a continuation of Ser. No. 864,049, May 16, 1986, Pat. No. 4,659,481, which is a continuation of Ser. No. 545,563, Oct. 26, 1983, abandoned. This application Jun. 6, 1988, Ser. No. 203,035
Int. Cl.[4] C02F *5/14*
U.S. Cl. 210—699 12 Claims

1. A method of inhibiting the formation of calcium oxalate scale formation in an aqeous medium hving a pH of at least about 7. comprising adding tos aid aqueous medium an effective amount to inhibit said formation of a water soluble or water dispersible polymer having repeat units represented by the formula



wherein E is the repeat unit remaining after polymerization of an α,β, ethylenically unsaturated compound, R_1 is H or lower (C_1–C_4) alkyl, R_2 is $(CH_2—CH_2—O)_nH$,

monohydroxylated C_1–C_8 alkyl, monohydroxylated C_1–C_8 alkylene, di-or polyhydroxy C_1–C_8 alkyl, dihydoxy or polyhy-

droxy C_1–C_8 alkylene, C_1–C_8 alkyl, or C_1–C_8 alkylene, n is an intger of from 1 to about 20, a is 0 or 1, X, is an anionic radical selected from the group consisting of SO_3, PO_3, PO_4, and CO0, Z, is H or hydrogens or a water soluble cation or cations, Z being chosen to counterbalance the valence of X, XZ combined also comprises an amine functionality of the formula

wherein F_1, F_2, and F_3 are independently selected from H and C_1–C_5 alkyl, C_1C_5 hydroxy-substituted or carboyx-substituted alkyl, the molar ratios of repeat units c:d being from about 30:1 to about 1:20.

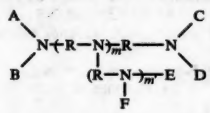
4,872,996

USE OF AMINOPHOSPHONIC ACIDS TO INHIBIT SCALE FORMATION AND CORROSION CAUSED BY MANGANESE IN WATER SYSTEMS

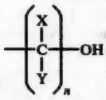
Jeffrey G. Grierson, Angleton; David A. Wilson, Richwood, and Druce K. Crump, Lake Jackson, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 25,420, Mar. 13, 1987, abandoned. This application Jan. 27, 1988, Ser. No. 148,809
The portion of the term of this patent subsequent to Feb. 3, 2004, has been disclaimed.
Int. Cl.[4] C02F *5/14*
U.S. Cl. 210—700 12 Claims

1. A process of inhibiting undesirable manganese deposition in water conducting systems which contain manganese at concentrations and under conditions such that the manganese will tend to precipitate as an insoluble compound and cause corrosion, the improvement which comprises adding to said water an organic aminophosphonic acid, wherein the nitrogen and phosphorus are interconnected by an alkylene or substituted alkylene radical, and having the formula



wherein substituents A, B, C, D, E and F are independently selected from hydrogen, $—CH_2PO_3H_2$,



and salts of the phosphonic acid radical, wherein X and Y are independently hydrogen, methyl or ethyl radicals, n is 2 or 3 and m and m′ each is 0–10, with the proviso that more than 50 percent of the amine hydrogens have been substituted by the phosphorus-containing group as previously defined herein, and wherein R is a hydrocarbon residue which can be a linear, branched, cyclic, heterocyclic or a substituted heterocyclic structure; with the further proviso that when m or m′ ≧ 1 the E and F substituents may be the same as or different from any other substituent of any other nitrogen atom and each R can be the same as or different from any other R.

4,872,997

COOLANT RECYCLING SYSTEM AND METHOD

Roger T. Becker, Kalamazoo, Mich., assignor to Monlan, Incorporated, Kalamazoo, Mich.

Filed Aug. 12, 1988, Ser. No. 231,824
Int. Cl.[4] B01D *17/035*
U.S. Cl. 210—703 18 Claims

1. An apparatus for recycling and cleaning a coolant utilized in conjunction with a machine tool to effect removal of tramp oil from the coolant, said apparatus comprising:

a frame;

tank means stationarily supported on said frame and defining there a recycling chamber adapted for holding a batch of dirty coolant, said chamber having substantially vertical height and substantially uniform horizontal cross section throughout this height,

means communicating with the lower portion of said chamber to effect removal of coolant therefrom;

first nozzle means stationarily mounted adjacent the bottom of said chamber for discharging directly into the dirty coolant a first airstream which creates a first upwardly directed stream of air bubbles;

second nozzle means stationarily disposed adjacent the bottom of said tank in sidewardly disposed relationship from said first nozzle means for discharging therefrom directly into said dirty coolant a second airstream which creates a second upwardly directed stream of air bubbles of a larger size than said air bubbles of said first stream;

wherein said first and second nozzle means are constructed and arranged such that the first and second bubble streams agitate the dirty coolant and cause upward movement of oil particles so that said tramp oil tends to collect on the surface of the dirty coolant within a collection area disposed over said first stream of air bubbles;

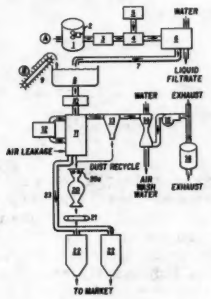
said collection area being of a smaller cross sectional area than said chamber horizontal cross section.

4,872,998

APPARATUS AND PROCESS FOR FORMING UNIFORM, PELLETIZABLE SLUDGE PRODUCT

Jerome Dausman, Arlington, Va., and Raymond J. Avendt, Annapolis, Md., assignors to Bio Gro Systems, Inc., Annapolis, Md.

Filed Jun. 10, 1988, Ser. No. 205,345
Int. Cl.[4] C02F *11/14*
U.S. Cl. 210—710 18 Claims



1. An automated, non-polluting process for mechanically dewatering and heat drying liquid sewage sludge of widely varying solids content within an apparatus having a predetermined capacity to form a pelletizable, dried sludge of predetermined uniform solids content without requiring recycling of previously heat processed sludge, comprising the steps of

a. limiting and modulating the flow of liquid sewage sludge

into the apparatus in a manner to prevent the capacity of the apparatus from being exceeded;

b. mixing with the liquid sewage sludge entering the apparatus a chemical substance which is capable of promoting flocculation and coagulation;

c. dewatering the chemically treated sludge by mechanically pressing the sludge to separate a substantial portion of liquid to form a cake sludge of at least approximately 10 percent solids; and

d. heat drying the cake sludge within an enclosed drying means without addition of recycled, previously heat processed sludge to form a pelletizable sludge having a predetermined uniform moisture content, said heat drying step including steps of

(i) bring the cake sludge into sliding contact with a heated surface,

(ii) agitating the cake sludge while in sliding contact the heated surface,

(iii) capturing in the enclosure and drawing away from said drying means substantially all gases and gas entrained particles expended from said sludge by said heat drying step for further processing,

(iv) continuing steps (i) and (ii) until the moisture content of the heat processed sludge is reduced to the desired predetermined level, and

(v) delivering said heat processed sludge to an accumulation means for storing said processed sludge.

4,872,999

MIXTURE OF HALIDES SUCH AS NAOCL AND A BROMIDE SALT FOR REMOVAL OF MUSSELS AND BARNACLES FROM SALT OR BRACKISH WATER

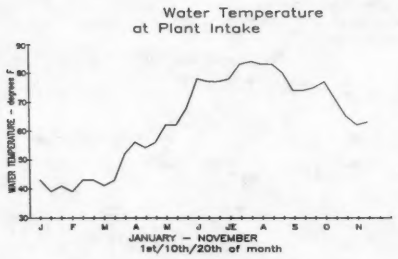
Ronald H. Schild; Sandra Koeplin-Gall, both of Naperville, Ill., and Gregory C. Broxterman, Midlothian, Va., assignors to Nalco Chemical Company, Naperville, Ill.

Filed Jul. 17, 1987, Ser. No. 74,966

The portion of the term of this patent subsequent to Feb. 17, 2004, has been disclaimed.

Int. Cl.[4] C02F *1/50*

U.S. Cl. 210—754 **6 Claims**



1. A method for controlling barnacles and a slime layer of a slime-forming organism selected from the group consisting of capsulated bacteria, diatoms and protozoa in salt water and brackish water, and bryozoans from sea water fouling, and selected from one member of the group consisting of barnacles, mussels, cyprpides, Polydora, Hydroides, Molgula, and Taxa in tidal brackish water which comprises treating said water with a composition comprising the combination of chlorine solution and a bromide salt capable of releasing bromide ions to the chlorine solution, and from about 1 up to about 10 percent by weight of a water-soluble biodispersant chosen from the group consisting of ethylene oxide condensates with propylene oxide adducts or propylene glycol having an HLB between 4–10 and a molecular weight between 1,000–5,000, nonionic polyethoxylated straight chain alcohols, tris cyanoethylated cocodiamines, polyoxethylene sorbitan ester/acids, nonionic N,N, dimethyl stearamides, nonionic amine polyglycol condensates, and nonionic ethyoxylated alcohols, and mixtures thereof.

4,873,000

CARPET FRESHENING AND DEODORIZING COMPOSITION

Jeanne M. Weller, Glen Rock, N.J., assignor to Sterling Drug Inc., New York, N.Y.

Filed Jun. 3, 1988, Ser. No. 202,776

Int. Cl.[4] D06M *11/04*; C11D *3/12*

U.S. Cl. 252—8.6 **9 Claims**

1. A powdered carpet deodorizer and freshener composition consisting essentially of:

(a) from about 57 to about 73 weight-percent of an inorganic salt selected from the group consisting of alkali metal and alkaline earth metal sulfates, bicarbonates and chlorides;

(b) from about 25 to about 40 weight-percent of an aluminum silicate clay derived from pyrophyllite and having a particle size distribution of from about 10 to about 60, microns;

(c) from about 1 to about 2 weight-percent of a liquid agglomerating agent; and

(d) from about 1 to about 2 weight-percent of a fragrance.

4,873,001

FABRIC SOFTENING AND ANTISTATIC LIQUID DETERGENT COMPOSITIONS

Pallassana N. Ramachandran, Robbinsville; Paul S. Grand, Highland Park, and Robert A. Bauman, New Brunswick, all of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 53,979, May 22, 1987. This application Jun. 17, 1988, Ser. No. 207,843

Int. Cl.[4] C11D *3/32*

U.S. Cl. 252—8.8 **12 Claims**

1. A fabric softening and antistatic liquid laundry detergent composition which comprises a detersive proportion a synthetic anionic organic detergent, a fabric softening proportion of bentonite and an antistatic proportion of N-higher aliphatic isostearamide antistat, in an aqueous medium.

4,873,002

LIQUID DETERGENT FABRIC CONDITIONING COMPOSITIONS

Nader Ibrahim, Flanders, N.J., assignor to Beecham Inc., Clifton, N.J.

Filed Nov. 23, 1982, Ser. No. 443,896

Int. Cl.[4] D06M *11/00*

U.S. Cl. 252—8.8 **14 Claims**

1. A detergent fabric conditioning composition capable of imparting detergency, softness and anti-static properties to fabrics treated therewith during the wash cycle of a laundering process which consists of 8% methyl-1-oleyl-amidoethyl-2-oleyl-imidazolinium methyl sulfate (75% active), 40% ethoxylated/propoxylated adduct of a C_{12}–C_{15} fatty alcohol, 5% coconut oil diethanolamide, 3% benzalkonium chloride, 10% ethyl alcohol and water qs.

4,873,003

CATIONIC SOIL RELEASE POLYMERS

Anthony J. O'Lenick, Jr., Lilburn, and Joseph J. Fanelli, Alpharetta, both of Ga., assignors to GAF Corporation, Wayne, N.J.

Division of Ser. No. 144,482, Jan. 13, 1988, Pat. No. 4,804,483, which is a continuation of Ser. No. 54,028, May 26, 1987, Pat. No. 4,738,787. This application Oct. 26, 1988, Ser. No. 262,650

Int. Cl.[4] C11D *1/62*

U.S. Cl. 252—8.75 **4 Claims**

1. A composition prepared by the reaction of an aromatic hydroxy containing polyester soil release agent with monochloracetic acid to produce an intermediate which is reacted

with an amine to make a quaternary compound useful in both a soil release and softening.

4,873,004

LUBRICATING COMPOSITION

Christiaan D. M. Beverwijk; Feike De Jong, both of Amsterdam, Netherlands, and Peter Sant, Wirral, United Kingdom, assignors to Shell Oil Company, Houston, Tex.

Filed Nov. 16, 1987, Ser. No. 121,193

Claims priority, application United Kingdom, Nov. 28, 1986, 8628523

Int. Cl.[4] C10M *133/44, 137/04*

U.S. Cl. 252—32.5 **11 Claims**

1. A lubricating composition comprising a major portion of a lubricating oil and a minor portion of an alkyl or alkenyl-substituted succinimide, wherein said succinimide is formed from the reaction product of:

(1) a polyamine possessing 3 to 25 carbon atoms, said polyamines being selected from linear alkylene polyamines, branched alkylene polyamines, cycloaliphatic polyamines and heterocyclic polyamines, and

(2) an alkyl or alkenyl-substituted succinic anhydride, wherein the alkyl or alkenyl moiety of said anhydride has a number average molecular weight from 600 to 1300 and where the average number of succinic groups per alkyl or alkenyl groups is between 1.4 and 4.0.

4,873,005

EXTRUSION LUBRICANT COMPRISING A HYDROCARBON WAX, FATTY ACID SALT AND AN ORGANIC MERCAPTAN

Jeffrey R. Hyde, West Chester, Ohio, assignor to Morton Thiokol, Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 101,658, Feb. 4, 1987, abandoned. This application May 14, 1987, Ser. No. 50,602

Int. Cl.[4] C10M *135/20*

U.S. Cl. 252—35 **36 Claims**

1. An extrusion lubricant composition comprising a mixture of:

(a) hydrocarbon wax; and

(b) Group II metal or lead salt of a fatty acid in relative amounts sufficient to produce a composition having a viscosity in excess of about 10,000 cps at 125° C.; and

(c) an organic mercaptan capable of reducing the viscosity of said mixture in an amount at least sufficient to reduce the viscosity of said mixture composition below about 10,000 cps at 125° C.

4,873,006

COMPOSITIONS CONTAINING ACTIVE SULFUR

James N. Vinci, Mayfield Heights, and Curtis R. Scharf, Wickliffe, both of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio

Filed Sep. 1, 1988, Ser. No. 239,586

Int. Cl.[4] C10M *135/02, 133/58*

U.S. Cl. 252—38 **4 Claims**

1. A method for reducing the presence of free hydrogen sulfide from an active sulfur containing compound including the steps of contacting (C) the active sulfur containing compound with (B) a nitrogen-containing carboxylic compound made by the reaction of at least one polycarboxylic acid acylating agent having at least one hydrocarbon-based substituent of about 12 to 500 carbon atoms with at least one of: (i) a N-(hydroxyl-substituted hydrocarbyl) amine; (ii) a hydroxyl-substituted poly(hydrocarbyloxy) analog of said amine; or (iii) mixtures of (i) and (ii), and heating the mixture of (B) and (C) to reduce the amount of free hydrogen sulfide.

4,873,007

METHOD FOR PRODUCING SULFURIZED ALKYLPHENOLS

Yuehsiung Chang, Naperville, Ill., assignor to Amoco Corporation, Chicago, Ill.

Filed Sep. 26, 1988, Ser. No. 249,607

Int. Cl.[4] C10M *135/02, 129/00*

U.S. Cl. 252—40.7 **4 Claims**

1. A process for preparing sulfurized alkyl-substituted phenol which comprises: reacting in a suitable vessel (a) alkyl-substituted phenol wherein the alkyl substituent comprises about 8 to about 50 carbons, (b) sulfur, (c) dihydric alcohol, (d) alkaline earth metal base, and (e) water the amounts of said reactants being as follows: about 1 to about 5 moles sulfur per mole of alkylphenol; about 0.01 to about 0.1 moles dihydric alcohol per mole of alkylphenol; about 0.01 to about 0.1 moles alkaline earth metal base per mole of alkylphenol; and about 0.02 to about 0.4 moles water per mole of alkylphenol, said reaction being conducted such that the water utilized in the reaction is retained in the reaction vessel, and wherein the amount of alkaline earth metal base used in the reaction results in a level of alkaline earth metal in the sulfurized alkylphenol product not exceeding about 1.0 wt. % of the product.

4,873,008

JOJOBA OIL AND JOJOBA OIL DERIVATIVE LUBRICANT COMPOSITIONS

Phillip S. Landis, Alexandria, Va., and Frank Erickson, Seattle, Wash., assignors to International Lubricants, Inc., Seattle, Wash.

Continuation of Ser. No. 88,186, Aug. 21, 1987, abandoned. This application Nov. 16, 1988, Ser. No. 273,709

Int. Cl.[4] C10M *141/10*

U.S. Cl. 252—46.6 **12 Claims**

1. A lubricant base concentrate comprising a base oil and a mixture of about 0.1% to about 20% (w/w) jojoba oil, about 0.1% to about 5% (w/w) of a sulfurized jojoba oil, and about 0.1% to about 5% (w/w) of a phosphite adduct of jojoba oil.

4,873,009

BORATED LUBE OIL ADDITIVE

Ronald L. Anderson, Naperville, Ill., assignor to Amoco Corporation, Chicago, Ill.

Continuation of Ser. No. 90,653, Aug. 28, 1987, abandoned, which is a continuation of Ser. No. 549,237, Nov. 4, 1983, abandoned, which is a continuation-in-part of Ser. No. 362,955, Mar. 29, 1982, abandoned. This application Jun. 28, 1988, Ser. No. 212,512

Int. Cl.[4] C10M *133/44, 139/00*

U.S. Cl. 252—49.6 **7 Claims**

1. A lube oil dispersant obtained by reacting a C_8- C_{500} polybutene succinic acid or anhydride compound and a hydroxypropylated alkylene diamine, the diamine being the reaction product of propylene oxide and an alkylene diamine having the formula NH_2- $(CH_2)_x$-NH_2 where X is from 2 to 24, and having an average of at least about 2 N-substituted hydroxypropyl groups, said dispersant also containing boron at a level which improves the compatibility of the dispersant toward fluorocarbon engine seals.

4,873,010

SPINDLE-LIKE MAGNETIC IRON OXIDE PARTICLES AND PROCESS FOR PRODUCING THE SAME

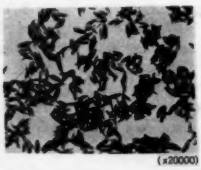
Atsushi Takedoi; Hiroyuki Kondo; Masaru Isoai; Yoshitaka Yoshinaga; Toshiharu Harada; Yosiro Okuda; Hiroshi Sumita; Hirofumi Kawasaki, and Kohji Mori, all of Hiroshima, Japan, assignors to Toda Kogyo Corp., Hiroshima, Japan

Continuation of Ser. No. 724,161, Apr. 17, 1985, abandoned. This application Apr. 15, 1987, Ser. No. 39,775

Claims priority, application Japan, Apr. 28, 1984, 59-87011; Jun. 30, 1984, 59-136341; Mar. 2, 1985, 60-42387

Int. Cl.[4] C04B *35/26*

U.S. Cl. 252—62.59 20 Claims



(x20000)

1. Magnetic iron oxide particles suitable for magnetic recording comprising spindle-shaped magnetite particles having substantially uniform particle shapes and being substantially free of dendrites, said magnetic particles having an aspect ratio (major axis:minor axis) of less than 4:1 and containing 0.1 to 20 atomic % of Si to Fe.

4,873,011

ANTIFREEZE CORROSION INHIBITOR COMPOSITION FOR ALUMINUM ENGINES AND RADIATORS

Il Nam Jung; Sang Yo Hwang, both of Seoul, and Chung Suk Lee, Busan, all of Rep. of Korea, assignors to Korea Advanced Institute of Science and Technology, Rep. of Korea

Filed Jul. 1, 1988, Ser. No. 214,680

Claims priority, application Rep. of Korea, Jan. 27, 1988, 647/1988[U]

Int. Cl.[4] C09K *5/00*

U.S. Cl. 252—75 1 Claim

1. An antifreeze corrosion inhibitor composition for aluminium engines and radiators which utilize a polyhydroxyalcohol-based coolant, comprising adding to the coolant:

(a) from about 0.07% to about 0.35% nitrate,

(b) from about 0.05% to about 0.50% silicate,

(c) from about 0.20% to about 2.00% phosphate,

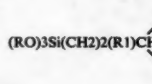
(d) from about 0.10% to about 1.00% molybdate,

(e) from about 0.02% to about 0.30% vanadate,

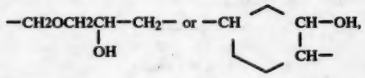
(f) from about 0.05% to about 0.30% of a compound selected from the group consisting of tolyltriazole, benzotriazole, and mixture thereof,

(g) from about 0.50% to about 4.00% of a mixture of benzoic acid and benzoate

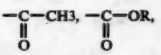
(h) from about 0.01% to about 0.50% of organosilane stabilizer for the silicate having the formula



wherein R is an alkyl group of 1–4 carbon atoms, R1 is either



and R2 and R3 may be same or different and selected from Ph, CN,



wherein R is an alkyl group of 1–4 carbon atoms,

wherein the cations are selected from the group consisting of sodium, potassium, and mixtures thereof and wherein the pH of the composition is from about 7 to about 9.

4,873,012

BUILT NONAQUEOUS LIQUID NONIOINIC LAUNDRY DETERGENT COMPOSITION CONTAINING HEXYLENE GLYCOL AND METHOD OF USE

Guy Broze, Grace-Hollogne, and Danielle Bastin, Soumagne, both of Belgium, assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 924,392, Oct. 29, 1986, abandoned. This application Feb. 1, 1988, Ser. No. 153,538

Int. Cl.[4] C11D *3/075, 3/395*

U.S. Cl. 252—99 17 Claims

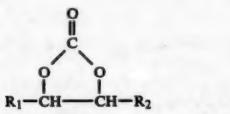
1. A nonaqueous heavy duty, built detergent composition which is pourable at high and low temperatures and does not gel when mixed with cold water, said composition comprising

at least one liquid nonionic surfactant in an amount of from about 20 to about 70 percent by weight;

at least one detergent builder salt suspended in the nonionic surfactant in an amount of about 10 to about 60 percent by weight;

hexylene glycol in an amount of about 10.5 to 30 percent; and

0.1 to 2 percent of a carbonate having the formula



where R_1 and R_2 are members selected from the group consisting of H and C_1 to C_4 lower alkyl, and R_1 and R_2 are the same or different.

4,873,013

AQUEOUS ALKALI METAL HALOGENITE COMPOSITIONS CONTAINING A COLORANT STABILIZED BY AMMONIUM HYDROXIDE

Richard S. Hutchings, Cincinnati, Ohio, assignor to The Dracket Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 165,046, Mar. 7, 1988, Pat. No. 4,790,950. This application Oct. 13, 1988, Ser. No. 256,897

The portion of the term of this patent subsequent to Dec. 13, 2005, has been disclaimed.

Int. Cl.[4] A01N *59/00;* C11D *3/48, 7/10;* D06L *3/08*

U.S. Cl. 252—102 15 Claims

1. An aqueous, alkaline cleaning composition comprising on a weight basis from about 0.01 to about 5% of an alkali metal halogenite; from about 0.01 to about 3% of a dye normally chemically incompatible with said halogenite in aqueous media, and a stabilizer which is ammonium hydroxide, said stabilizer being present in the composition in an amount effective to

stabilize the composition as evidenced by a substantial absence of chloride dioxide in the composition.

4,873,014

POLYAMINE-POLYGLYCOL INHIBITOR FOR STEEL PICKLING

Ray S. Long, Walnut Creek, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Filed Jan. 27, 1988, Ser. No. 149,022
Int. Cl.[4] C23F *11/04, 11/14*
U.S. Cl. 252—148 **17 Claims**

1. A pickling composition, useful in the inhibition of the corrosion of iron-containing metals, consisting essentially of hydrochloric acid, water and a mixture containing from about 0.05 to about 0.5 percent of the composition of a mixture of about 65 to about 95 weight percent of at least one polyalkylene polyamine based on the weight of polyalkylene polyamine and polyglycol and from about 5 to about 35 weight percent of at least one polyglycol based on the weight of polyalkylene polyamine and polyglycol wherein the polyalkylene polyamine corresponds to the formula

$$H_2N—(R—NH)_n—R—NH_2$$

wherein R may be ethylene or propylene and n is a number from 1 to about 165 such that the molecular weight of the polyalkylene polyamine is at least about 100 and is no greater than about 5000.

4,873,015

AZEOTROPE-LIKE COMPOSITIONS OF 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, METHANOL, NITROMETHANE AND DIMETHOXYMETHANE

Ellen L. Swan, Ransomville; Rajat S. Basu, Williamsville; Earl A. E. Lund, West Seneca, and David P. Wilson, Williamsville, all of N.Y., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Oct. 31, 1988, Ser. No. 264,552
Int. Cl.[4] C11D *7/50, 7/30*
U.S. Cl. 252—171 **11 Claims**

1. Azeotrope-like compositions consisting essentially of 1,1,2-trichloro-1,2,2-trifluoroethane, methanol, nitromethane and at least about 14.5 weight percent dimethoxymethane wherein said compositions have a boiling point of about 39.7° C. ±1° C. at 760 mm Hg.

4,873,016

ENZYMATIC DETERGENT COMPOSITION

David Thom, Voorburg; Ton Swarthoff, Hellevoetsluis, and Jan Maat, Monster, all of Netherlands, assignors to Lever Brothers Company, New York, N.Y.

Continuation-in-part of Ser. No. 870,252, Jun. 3, 1986, Pat. No. 4,707,291. This application Jun. 3, 1987, Ser. No. 57,075
Claims priority, application United Kingdom, Jun. 11, 1985, 8514707
The portion of the term of this patent subsequent to Nov. 17, 2004, has been disclaimed.
Int. Cl.[4] C11D *3/386, 3/395*
U.S. Cl. 252—174.12 **4 Claims**

1. A detergent composition comprising from 1 to 30% of a mixture of an anionic and a nonionic detergent-active compound in a weight ratio from 12:1 to 1:12, from 1 to 35% of a bleaching agent, and a lypolytic enzyme, wherein the enzyme shows a positive immunological cross-reaction with the antibody of the lipase produced by the microorganism *Pseudomonas fluorescens* IAM 1057, said composition containing the enzyme in such an amount that the final composition has a lipolytic activity of from 0.005 to 100 Lipase Units per milligram.

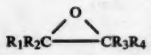
4,873,017

HETEROGENEOUS ALKOXYLATION USING ANION-BOUND METAL OXIDES

Stephen W. King, Charleston, W. Va., assignor to Union Carbide Corporation, Danbury, Conn.

Division of Ser. No. 753,543, Jul. 10, 1985, Pat. No. 4,727,199. This application Nov. 12, 1987, Ser. No. 119,690
Int. Cl.[4] C09K *11/07, 3/00*; C07C *41/03*
U.S. Cl. 252—183.11 **16 Claims**

1. Composition comprising (a) a liquid or solid epoxide compound having the formula:



wherein R_1, R_2, R_3 and R_4 are each H or $—(CH_2)_nCH_3$, wherein n is 0 to 3, with the proviso that R_1, R_2, R_3 and R_4 can be the same or different, (b) an active-hydrogen compound, said active-hydrogen compound being in the liquid or gaseous state, and (c) a catalytic amount of at least one solid anion-bound metal oxide heterogeneous catalyst, wherein said anion in said anion-bound metal oxide heterogeneous catalyst is SO_4, BF_4, CO_3, BO_3, HPO_4, SeO_4, MoO_4, B_4O_7 or PF_6, and the metal oxide is zirconium oxide, nickel oxide, aluminum oxide, tin oxide, magnesium oxide, iron oxide, titanium oxide, thorium oxide, hafnium oxide or rubidium oxide, said anion-bound metal oxide heterogeneous catalyst being an amorphous or primarily amorphous compound, said active-hydrogen compound not poisoning said anion bound metal oxide heterogeneous catalyst.

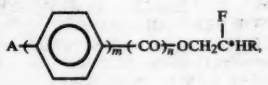
4,873,018

OPTICALLY ACTIVE COMPOUND, PROCESS FOR PRODUCING SAME AND LIQUID CRYSTAL COMPOSITION CONTAINING SAME

Hiroyuki Nohira; Masanao Kamei; Shinichi Nakamura, all of Urawa; Kazuo Yoshinaga, Machida; Mariko Kai, Sugitomachi, and Kazuharu Katagiri, Tama, all of Japan, assignors to Canon Kabushiki Kaisha and Yamakawa Yakuhin Kogyo Kabushiki Kaisha, both of Tokyo, Japan

Division of Ser. No. 919,376, Oct. 16, 1986, Pat. No. 4,798,680. This application Oct. 27, 1987, Ser. No. 112,936
Claims priority, application Japan, Oct. 18, 1985, 60-232886; Feb. 26, 1986, 61-40793
Int. Cl.[4] G02F *1/13*; C09K *19/52*; C07C *69/76, 69/00*; C07G *41/00, 43/02*
U.S. Cl. 252—299.01 **21 Claims**

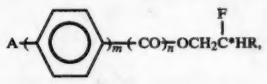
1. An optically active compound represented by the formula (Ib):



(Ib)

wherein R is an alkyl group having 1–16 carbon atoms, C* is an asymmetric carbon atom, m is 1 or 2, n is 0 or 1, and A is a releaseable substituent selected from the group consisting of hydroxy, halogen, phenoxy, toluenesulfonyl, acetyloxy, and trifluoroacetyloxy.

9. A liquid crystal composition comprising a liquid crystal and at least one species of optically active compound represented by the formula (Ib):



(Ib)

wherein R is an alkyl group having 1–16 carbon atoms, C* is an

asymmetric carbon atom, m is 1 or 2, n is 0 or 1, and A is a releaseable substituent selected from the group consisting of hydroxy, halogen, phenoxy, toluenesulfonyl, acetyloxy, and trifluoroacetyloxy.

4,873,019

CYCLOPENTANE DERIVATIVES

Joachim Krause, Dieburg; Andreas Wächtler, Griesheim, both of Fed. Rep. of Germany; Bernard Scheuble, Yokohama, Japan, and Georg Weber, Erzhausen, Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit Beschrankter Haftung, Darmstadt, Fed. Rep. of Germany

Filed Dec. 18, 1987, Ser. No. 135,103

Claims priority, application Fed. Rep. of Germany, Dec. 20, 1986, 3643795

Int. Cl.[4] G02F *1/13*; C09K *19/30*; C07C *69/74, 69/773, 43/21*

U.S. Cl. 252—299.61 **15 Claims**

1. A liquid-crystalline phase having at least two liquid-crystalline components, wherein at least one liquid-crystalline compound is of the formula

$$R^1—A^1—Z^1—A^2—(Z^2—A^3)_n—R^2$$

wherein

R^1 and R^2, in each case independently of one another, are alkyl of 1–15 carbon atoms, or alkyl of 1–15 carbon atoms in which one or more non-adjacent CH_2 groups are replaced by —O—, —CO—, —O—CO—, —O—CO—O—, —CHhalogen—, —CHCN— and/or —CH=CH—, and one of R^1 and R^2 can also be F, Cl, CN, or —NCS,

Z^1 and Z^2 in each case independently of one another, are —CO—O—, —O—CO—, $—CH_2CH_2—$, $—CH_2—O—$, $—OCH_2—$, —N=N—, —NO=N—, —CH=N or a single bond, and one of Z^1 and Z^2 can also be —CO—,

A^1, A^2 and A^3 in each case independently of one another, are 1,4-phenylene, 1,4-phenylene in which one or more CH groups are replaced by N, 1,4-cyclohexylene, 1,4-cyclohexylene in which one or two non-adjacent CH_2 groups are replaced by O and/or S, 1,3-cyclopentylene, 1,3-cyclopentylene in which one or two non-adjacent CH_2 groups are replaced by O and/or S, 1,4-bicyclo-(2,2,2)-octylene, piperidine-1,4-diyl, naphthalene-2,6-diyl, decahydronaphthalene-2,6-diyl or 1,2,3,4-tetrahydronaphthalene-2,6-diyl, each of which can also be substituted by halogen, nitrile and/or alkyl, and

n is 0, 1 or 2,

with the proviso that at least one of the rings A^1, A^2 and A^3 is 1,3-cyclopentylene or 1,3-cyclopentylene in which one or two non-adjacent CH_2 groups are replaced by O and/or S.

4,873,020

FLUOROCHEMICAL SURFACTANTS AND PROCESS FOR PREPARING SAME

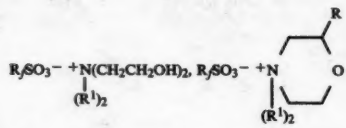
Imelda A. Muggli, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 4, 1988, Ser. No. 253,136

Int. Cl.[4] B01F *17/16*; C11D *3/26*

U.S. Cl. 252—355 **8 Claims**

1. Fluorochemical surfactant compositions comprising at least one fluorochemical amine salt which can be represented by the formula:



wherein R_f is a perfluoroaliphatic radical containing 3 to 20 carbon atoms, R is H or CH_3, and each R^1 is independently an alkyl radical containing 1 to 4 carbon atoms.

4,873,021

AZEOTROPE OR AZEOTROPE-LIKE COMPOSITION OF TRICHLOROTRIFLUOROETHANE AND DICHLORODIFLUOROETHANE

Robert A. Gorski, Newark; Bernhardt J. Eiseman, Jr., late of Wilmington, both of Del. (by Carol E. Aronoff, executrix), and Donovan E. Kvalnes, late of Castine, Mass. (by Atherton Fuller, personal representative), assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 30, 1986, Ser. No. 947,834

Int. Cl.[4] C11D *7/50*; B01F *1/00*; C23G *5/028*

U.S. Cl. 252—364 **2 Claims**

1. An azeotrope comprising an admixture of about 50.5 wt. percent 1,1,2-trichloro-1,2,2-trifluoroethane and about 49.5 wt. percent 1,2-dichloro-1,1-difluoroethane.

4,873,022

ELECTRICALLY CONDUCTIVE PASTE, ELECTRONIC CIRCUIT COMPONENT AND METHOD FOR PRODUCING SAME

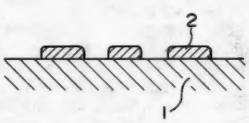
Toshio Ogawa, Katsuta; Mituru Fujii, Hadano; Tadamichi Asai, Ibaraki; Akira Ikegami, Hitachi; Hiroshi Ohtsu, Mito, and Kazuhiko Ato, both of Mito, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 30, 1987, Ser. No. 139,792

Claims priority, application Japan, Jan. 9, 1987, 62-1644; Sep. 4, 1987, 62-220174

Int. Cl.[4] B32B *3/00*

U.S. Cl. 428—209 **30 Claims**



1. An electrically conductive paste which comprises 100 parts by weight of a copper powder of 1 μm or less in average particle size, 0.01–4 parts by weight of at least one of S, Te and Se and a frit glass as a binder.

5. An electronic circuit component comprising an insulating base and a copper film circuit formed thereon by firing, wherein average surface roughness of said insulating base is 1 μm or less and is 1/5 or less of the thickness of film circuit formed thereon and said copper film circuit consists essentially of 100 parts by weight of copper, 0.005–2 parts by weight of at least one of S, Te and Se and 1–10 parts by weight of a glass.

4,873,023

PREPARATION OF MONOOLEFINICALLY UNSATURATED CARBOXYL-CONTAINING VERSATIC ESTERS

Guenther Schulz, Bad Duerkheim; Wolfgang Druschke, Dirmstein, and Helmut Jaeger, Bobenheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

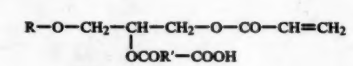
Filed Nov. 21, 1988, Ser. No. 273,973

Claims priority, application Fed. Rep. of Germany, Nov. 21, 1987, 3739542

Int. Cl.[4] C11C *1/00*

U.S. Cl. 260—404.8 **3 Claims**

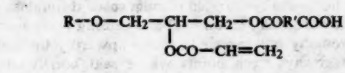
1. A process for preparing a compound of the general formula



I

-continued

or



II

where R is versatyl and R′ is unsubstituted or alkyl-substituted straight-chain alkylene of 4 or 5 carbon atoms, which comprises reacting the versatic ester of 1,3-dihydroxy-propyl-2 acrylate or of 2,3-dihydroxy-propyl-1 acrylate with an equimolar amount of a saturated or monoolefinically unsaturated cyclic dicarboxylic anhydride having 4 or 5 carbon atoms and an oxygen atom in the ring at from 50° to 150° C. in the presence of an esterification catalyst.

4,873,024

METHOD OF SYNTHESIZING LEUKOTRIENE B_4 AND DERIVATIVES THEREOF

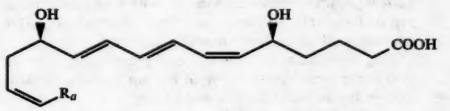
Yoshihiro Abe, Tokyo, Japan, and Kyriacos C. Nocolaou, Havertown, Pa., assignors to University of Pennsylvania, Philadelphia, Pa.

Filed Mar. 8, 1988, Ser. No. 165,521

Int. Cl.[4] C07C *51/09*

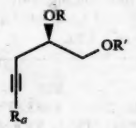
U.S. Cl. 260—405.5 11 Claims

1. A process for preparing a compound of the formula



where R_a is selected from the group consisting of hydrocarbon groups, and C_1–C_6 linear alkyl groups substituted at their termini with a C_1–C_2 haloalkyl group; comprising

(a) hydrogenating a compound of the formula

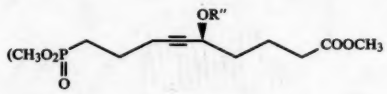


where R and R′ are different from one another and are protecting groups, to reduce the acetylene bond;

(b) removing the protecting group R′ at position 1 from the product of step (a);

(c) oxidizing the product of step (b) to convert the alcohol group at position 1 to an aldehyde;

(d) coupling the product of step (c) with a compound of the formula



where R″ is a protecting group;

(e) hydrogenating the product of step (d) to reduce the acetylene bond; and

(f) removing the protecting groups R and R″ and the methyl group from the ester from the product of step (e) to yield the desired compound.

4,873,025

ALKYLXYLENE SULFONATE COMPOSITIONS

Theodorus A. B. M. Bolsman, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

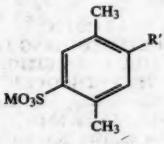
Filed Dec. 12, 1983, Ser. No. 560,468

Claims priority, application United Kingdom, Dec. 13, 1982, 8235499

Int. Cl.[4] C07C *143/24*

U.S. Cl. 562—91 2 Claims

1. A surface active composition consisting essentially of alkylxylene sulfonate compounds of the formula



wherein M represents a hydrogen, a metal, an ammonium or an amine ion and R′ represents a C_8 to C_{10} alkyl group in about 35 percent by weight of the compounds, R′ represents a C_{11} or C_{12} alkyl group in about 40 percent by weight of the compounds, and R′ represents a C_{13} or C_{14} alkyl group in about 25 percent by weight of the compounds.

4,873,026

PROCESS FOR THE PREPARATION OF 1-AMINONAPHTHALENE-2,4,7-TRISULPHONIC ACID AND 1-AMINONAPHTHALENE-7-SULPHONIC ACID

Horst Behre; Heinz U. Blank, both of Odenthal; Gerhard Marzolph, and Willi Streicher, both of Koeln, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 900,215, Aug. 26, 1986, abandoned. This application Oct. 4, 1988, Ser. No. 253,280

Claims priority, application Fed. Rep. of Germany, Sep. 7, 1985, 3531923

Int. Cl.[4] C07C *143/60*

U.S. Cl. 562—72 7 Claims

1. A process for the preparation of 1-aminonaphthalene-2,4,7-trisulphonic acid which comprises the steps

(a) reacting 1-nitronaphthalene by the Piria method with bisulphites,

(b) sulphonating the sulphamate mixture obtained in this Piria reaction with sulphur trioxide in sulphuric acid and

(c) isolating the 1-amino-naphthalene-2,4,7-trisulphonic acid from the sulphonation mixture.

4,873,027

FLUOROALKYLARYLIODONUIM COMPOUNDS

Teruo Umemoto, and Yoshihiko Gotoh, both of Kanagawa, Japan, assignors to Sagami Chemical Research Center, Tokyo, Japan

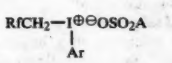
Division of Ser. No. 148,181, Jan. 27, 1988, abandoned, which is a continuation of Ser. No. 913,591, Oct. 1, 1986, abandoned, which is a continuation of Ser. No. 753,835, Jul. 11, 1985, abandoned. This application Sep. 19, 1988, Ser. No. 245,940

Claims priority, application Japan, Jul. 11, 1984, 59-142449

Int. Cl.[4] C07C *143/02, 19/08*

U.S. Cl. 562—83 2 Claims

1. A fluoroalkyliodonium compounds represented by the formula (I):



(I)

wherein Ar represents a substituted or unsubstituted phenyl group wherein the substituent is an alkyl group having 1 to 5

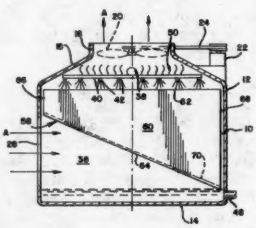
carbon atoms or a halogen atom, A represents a trifluoromethyl group or a fluorine atom, and Rf represents a polyfluoroalkyl group having 1 to 20 carbon atoms or a group of the formula

$$\underset{\displaystyle Ar}{ASO_2O^{\ominus}\overset{}{I^{\oplus}}}CH_2(CF_2)_n$$

wherein A and Ar are as defined above, and n is an integer of 1 to 20.

4,873,028
LOW SILHOUETTE COOLING TOWER WITH TRAPEZOIDAL FILL AND METHOD OF AIR FLOW THERETHROUGH

Bryan F. Garrish, Ellicott City, Md., assignor to Baltimore Aircoil Company, Inc., Jessup, Md.
Filed Feb. 22, 1988, Ser. No. 158,603
Int. Cl.[4] B01F *3/04;* **F28C** *1/02*
U.S. Cl. 261—109 **10 Claims**



1. An improved counterflow cooling water tower comprising:

an enclosure having vertical walls including one wall with an air inlet in a lower portion thereof and a second wall opposite said one wall;

a plurality of heat transfer media extending across said enclosure from about said one wall to about said second wall so as to form a plurality of parallel air passageways, said passageways being aligned with said air inlet and perpendicular to said one wall, each of said media having an upper extremity extending in a horizontal substantially straight line above said air inlet from about said one wall to said second wall, each of said media also having a lower extremity sloping downwardly in one direction from said one wall above said air inlet along a substantially continuous line to about said second wall whereby to define a plenum space inward of said air inlet, said plenum space having an interface with the lower extremity of said media which slopes continuously downwardly in one direction from said one wall to said second wall.

8. An improved method for moving air through a counterflow cooling tower, said method comprising:

forming an enclosure having vertical walls including one wall with an air inlet in a lower portion thereof and a second wall opposite said one wall;

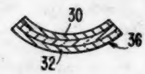
placing heat transfer media within said enclosure to define a plenum space between said air inlet and said second wall, said media extending across said enclosure between said one wall and said second wall so as to form a plurality of parallel air passageways aligned with said air inlet and perpendicular to said one wall;

maintaining each of said media in a vertical altitude with an upper extremity extending in a horizontal substantially straight line between said one wall and said other wall and a lower extremity extending from said one wall above said air inlet along a substantially continuous downwardly sloped line to said second wall whereby said plenum space interface with said media slopes continuously downwardly in one direction from a top of said air inlet; and

moving air horizontally into said plenum space through said air inlet toward said second wall and causing portions of the horizontally moving air to move upwardly through said passageways from points where said horizontally moving air reaches said interface whereby the vertical path and resistance to flow of air in said air passageways is increased as the horizontal distance from said one side is increased and thereby causing a relatively greater rate of vertical air flow near said one side.

4,873,029
METHOD FOR MANUFACTURING LENSES

Ronald D. Blum, 2840 Hershberger Dr., Roanoke, Va. 24017
Filed Oct. 30, 1987, Ser. No. 114,962
Int. Cl.[4] B29D *11/00*
U.S. Cl. 264—1.3 **22 Claims**



1. A method for tinting plastic lens comprising:

(a) arrange a first mold form for receiving molding material;

(b) delivering plastic molding material to said first mold form;

(c) inserting a tinted wafer of solidified plastic material capable of intermolecular bonding with said plastic molding material into said first mold form in contiguous relationship with said plastic molding material;

(d) fixing a second mold form in sealed relationship with said first mold form to form a mold having a cavity between said wafer and said second mold form;

(e) inserting additional plastic molding material into said mold cavity;

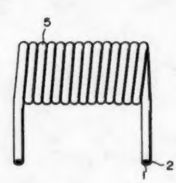
(f) said mold forms configured to form a lens of preselected shape;

(g) subjecting said mold to oven curing process to solidify the plastic molding material and to cause intermolecular bonding between the molding material and the wafer; and

(h) removing said molded material from said mold with said wafer in the form of a lens.

4,873,030
METHOD OF MOLDING A RESINOUS OPTICAL TRANSMITTING ELEMENT

Noriaki Taketani, Katsuta; Hideki Asano; Akira Endo, both of Mito; Tomiya Abe, Hitachi; Masahiko Ibamoto, Katsuta; Junji Mukai, Hitachi; Seikichi Tanno, Hitachi; Shuji Eguchi, Hitachi, and Masato Shimura, Hitachi, all of Japan, assignors to Hitachi, Ltd. and Hitachi Cable, Ltd., both of Tokyo, Japan
Filed Jul. 1, 1988, Ser. No. 214,463
Claims priority, application Japan, Jul. 6, 1987, 62-166797
Int. Cl.[4] B29D *11/00;* **G02B** *6/16*
U.S. Cl. 264—1.5 **11 Claims**



1. A method of manufacturing a resinous optical transmitting element comprising a core through which light is transmitted,

and a cladding which is lower in refractive index than said core, said method comprising the steps of polymerizing polymeric material forming said core, within a mold having a predetermined non-linear cavity, subsequently removing said mold, and forming said cladding about said core.

4,873,031

METHOD OF CONTROLLING THE CRYSTAL GRAIN SIZE OF URANIUM DIOXIDE PELLET

Tadao Yato, Mito; Sadaaki Hagino, Urawa, and Hiroshi Tanaka, Omiya, all of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 30, 1987, Ser. No. 139,447

Int. Cl.[4] G21C *21/00*; C09K *11/04*; G21G *4/00*; C04B *35/05*

U.S. Cl. 264—0.5 **4 Claims**

1. A method of controlling the crystal grain size of UO_2 pellets, comprising

(1) providing an aqueous uranyl solution which is free of hydrofluoric acid and nitric acid and which contains uranyl fluoride (UO_2F_2) and/or uranyl nitrate ($UO_2(NO_3)_2$) as a uranium component,

(2) reacting with ammonia said aqueous uranyl solution to precipitate ammonium diuranate (ADU), while adjusting the ratio of said uranium components to a predetermined value within the range varying from the ratio 100% of uranyl fluoride and 0% of uranyl nitrate to the ratio 0% or uranyl fluoride and 100% of uranyl nitrate, adjusting the concentration of uranium of the reaction mixture to 50 to 1,000 gU/liter and also adjusting the rate of contact between said uranium component in said aqueous uranyl solution wih ammonia to at least 2 moles NH_3/min/mole U,

(3) calcining and reducing said ADU precipitate to form UO_2 powder, and

(4) molding and sintering said UO_2 powder, thus producing UO_2 pellet having a predetermined crystal grain size in the range varying from 5 to 100 micrometeres.

4,873,032

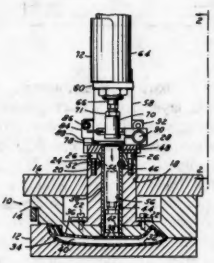
POUR HOLE CLOSER, STRAIGHT IN TYPE, FOR USE WITH INJECTION FOAM MOLDING SYSTEM

Webster Kohlhase, Portsmouth, N.H., assignor to Davidson Textron Inc., Dover, N.H.

Filed Apr. 18, 1988, Ser. No. 182,839

Int. Cl.[4] B29C *67/22*; B29B *17/00*

U.S. Cl. 264—39 **10 Claims**



1. In conjunction with filling a cavity in a mold by injecting a foam material through a pour opening therein leading to said cavity, a method plugging the pour opening during the reaction period of said foam material curing in said cavity, said method comprising the steps of:

(a) moving a vertically oriented power cylinder including a cylinder rod having a plug of flexible plastic material formed on the lower end thereof laterally into position above and in axial alignment with the pour opening;

(b) activating said cylinder so as to project said plug vertically downwardly into said pour opening to effect flexure of said plug so that said plug has sliding and sealing interference ft with said pour opening during the foam reaction period; and

(c) retracting the cylinder rod and plug from said pour opening subsequent to said reaction period to clear said pour opening.

4,873,033

PROCESS FOR THE PRODUCTION OF HYPERFILTRATION MEMBRANES

Klaus Heckmann, Regensburg; Georg Manecke, Berlin; Beate Pfannenmüller, Frieburg; Klaus Ring, Frankfurt, and Helmut Ringsdorf, Mainz, all of Fed. Rep. of Germany, assignors to Klaus Heckmann, Regensburg, Fed. Rep. of Germany

Division of Ser. No. 598,083, Apr. 9, 1984, Pat. No. 4,758,342, which is a continuation of Ser. No. 351,286, Feb. 22, 1982, abandoned. This application Jun. 22, 1988, Ser. No. 209,839

Claims priority, application Fed. Rep. of Germany, Feb. 27, 1981, 3107527

Int. Cl.[4] B29C *41/24*

U.S. Cl. 264—41 **10 Claims**

1. A method for producing a filtration membrane comprising a separation layer comprising at least one crosslinked monomolecular film formed from a surfactant each molecule of which contains at least one hydrophobic chain and at least one hydrophilic group, said separation layer being supported by a porous, mechanically stable supporting layer, which comprises: spreading said surfactant dissolved in a volatile or water soluble solvent upon the surface of an aqueous medium, or at the interface of an aqueous medium and a liquid immiscible therewith, to form a film the molecules of which have a predetermined average distance between each other obtained either by compressing said film to a predetermined pressure or by spreading a predetermined quantity of said surfactant within a predetermined area; crosslinking molecules of said surfactant through polymerizable or condensable groups in at least one of their hydrophobic chains or at least one of their hydrophylic groups to form a crosslinked film; and applying said crosslinked film constituting said separation layer to a mechanically stable supporting layer to form said filtration membrane.

4,873,034

PROCESS FOR PRODUCING MICROPOROUS ULTRA-HIGH-MOLECULAR-WEIGHT POLYOLEFIN MEMBRANE

Koichi Kono, Asaka; Kenkichi Okamoto; Rumi Iwasaki, both of Yokohama, and Shuichi Sawada, Ooi, all of Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 22, 1988, Ser. No. 223,123

Int. Cl.[4] B29C *47/78*, *55/04*, *55/12*; C08J *9/28*

U.S. Cl. 264—41 **9 Claims**

1. A process for producing a microporous ultra-high-molecular-weight polyolefin membrane, comprising the steps of:

(a) preparing a solution of an ultra-high-molecular-weight polyolefin having a weight-average molecular weight of 5×10^5 or more;

(b) extruding said solution from a die, said solution being

rapidly cooled to its gelation temperature or below before extrusion, thereby forming a gel-like sheet;

(c) removing at least 10 wt % of said solvent from said gel-like sheet so that said gel-like sheet contains 10 to 90 wt % of said ultra-high-molecular-weight polyolefin;

(d) stretching said gel-like sheet at a temperature equal to or lower than that which is 10° C. above the melting point of said ultra-high-molecular-weight polyolefin; and

(e) removing the residual solvent from the stretched product.

4,873,035

PREPARATION OF SIZED POPULATIONS OF LIPOSOMES

Martin Wong, Grayslake, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Filed Nov. 25, 1987, Ser. No. 125,505
Int. Cl.[4] A61K *9/50;* B01J *13/02*
U.S. Cl. 264—4.6 15 Claims

1. A method for the preparation of a substantially homogeneous population of aqueous liquid encapsulating multilamellar lipid vesicles having mean diameters within the range of from about 50 to about 3,000 nanometers, said method comprising the steps of:

(1) adding to a vessel one or more lipids in an organic solvent, said organic solvent being in an amount which allows said lipids to be dried as a film on the walls of said vessel;

(2) drying said lipids to a thin film onto the walls of said vessel;

(3) adding to said vessel an aqueous liquid and a collection of contact masses having means diameters within the range of from 50 to 3000 microns, said aqueous liquid being in an amount sufficient to result in a concentration of lipid which is less than about 1 mole per liter, and said contact masses being in an amount which is not: (a) so numerous that agitation of said masses in said vessel cannot be performed; and (b) so small that collisions between said contact masses and collisions between said contact masses and said walls do not occur; and

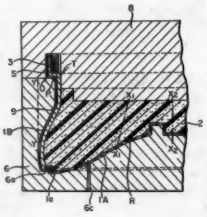
(4) agitating said vessel to form said multilamellar vesicles.

4,873,036

METHOD OF MAKING INTEGRALLY FOAM-MOLDED SEATS

Muneharu Ural, Tokyo, Japan, assignor to Tachi-S Co. Ltd., Tokyo, Japan

Filed Feb. 23, 1988, Ser. No. 159,323
Int. Cl.[4] B29C *67/22*
U.S. Cl. 264—46.6 15 Claims



1. A method of making an integrally foam-molded seat by disposing a surface cover along an inner wall surface of a molding cavity of a lower mold used for molding a polyurethane foam and having a seat surface pattern embossed on said inner wall surface, injecting a polyurethane resin solution into the molding cavity of said lower mold and foaming polyurethane resin to mold the polyurethane foam integrally combined with the surface cover, said method comprising the steps of:

defining, adjacent to an upper peripheral edge of the molding cavity of said lower mold, a mold portion having a shape conforming to the shape of the combination of an upper end of the surface cover and surface-cover end retaining member;

providing a surface cover having a surface cover end retaining member along its marginal edge;

carrying out mold-releasing treatment to an inner surface of a side part of the surface cover and/or that of the portion of a seat base part of the surface cover adjacent to said side part, so that the portion of said surface cover so treated will not adhere to the molded polyurethane foam;

attaching said surface cover to an outer surface of a surface cover mounting plate having the same shape as that of a side part of said surface cover;

placing said surface cover along the inner wall surface of the molding cavity of said lower mold with said surface cover end retaining member received in said mold portion having a shape conforming to the shape of the combination of the upper end of the surface cover and the surface cover end retaining member;

injecting the polyurethane resin solution into the molding cavity of said lower mold; and

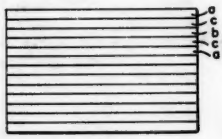
foaming the polyurethane resin to mold the polyurethane foam integrally combined with those portions of said surface cover which did not receive said mold-releasing treatment.

4,873,037

METHOD FOR PREPARING AN ASYMMETRIC SEMI-PERMEABLE MEMBRANE

C. C. Chau; Jang-hi Im; Otto C. Raspor, and Lu H. Tung, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 5, 1988, Ser. No. 253,458
Int. Cl.[4] B05D *3/00;* B29C *43/30, 47/06;* B32B *31/00*
U.S. Cl. 264—49 34 Claims



1. A method for preparing an asymmetric membrane comprising a separation layer and a microporous support layer comprising providing a membrane support structure by:

forming a lamellar polymeric composition by dividing and reorienting a plurality of adjacent layers of polymeric materials, each layer comprising at least two different polymeric materials and having a thickness of from 0.03 to 5 microns to form discrete domains of said polymeric materials of random orientation, at least one of said different polymeric materials having a preferential solubility in a selected solvent with respect to at least one other of said different polymeric materials;

forming a melt composition of said lamellar polymeric composition into a thin solid support structure; and

converting said thin solid support structure to an asymmetric membrane by:

(A) providing a separation layer on one major surface of said support structure and treating said separation layer-coated support structure with an extraction medium which is substantially inert with respect to said separation layer to remove said preferentially soluble polymeric material to provide an asymmetric membrane

structure comprising at least one separation layer and at least one porous support layer; or

(B) contacting said solid support structure with an extraction medium which has a preferential solubility for at least one of said at least two different polymeric materials, whereby said preferentially soluble polymeric material is removed from said solid support structure to form a porous structure and providing a separation layer on one major surface of said porous structure.

4,873,038

METHOD FOR PRODUCING CERAMIC/METAL HEAT STORAGE MEDIA, AND TO THE PRODUCT THEREOF

Robert A. Rapp, Columbus, Ohio, and E. Allen LaRoche, Jr., Middletown, Del., assignors to Lanxide Technology Comapny, LP, Newark, Del.

Filed Jul. 6, 1987, Ser. No. 69,732
Int. Cl.[4] C04B *35/71, 35/02*
U.S. Cl. 264—60 **24 Claims**

1. A method for producing a direct contact heat storage medium comprising a body of parent metal and intrinsically cohesive ceramic layer formed integrally with the metal body and encapsulating said parent metal body, which method comprises:

(a) heating a body of parent metal in the presence of an oxidant to a temperature above the melting point of said parent metal but below the melting point of its oxidation reaction product formed in step (b), to form molten parent metal, and

(b) at said temperature,

(i) reacting said molten parent metal with said oxidant outwardly from the surface of said parent metal body to form integrally with the body of parent metal a layer of oxidation reaction product,

(ii) transporting said molten parent metal through said oxidation reaction product into contact with said oxidant so that fresh oxidation reaction product continues to form at the interface between said oxidant and previously formed oxidation reaction product thereby continuously forming a progressively thicker layer of oxidation reaction product outwardly from said surface and concurrently depleting molten metal from said body,

(iii) continuing said reaction for a time sufficient to develop said progressively thicker layer to sufficient thickness to substantially completely encapsulate unreacted parent metal and to have a cavity resulting from said depletion, and

(c) recovering the resulting heat storage medium.

4,873,039

METHOD FOR PRODUCING SHAPED ARTICLES OF CERAMICS

Tamio Serita, Chibashi, and Hiroyuki Takeuchi, Minamtashi, both of Japan, assignors to Chisso Corporation, Osaka, Japan

Continuation of Ser. No. 868,038, May 29, 1986, abandoned.
This application Feb. 16, 1988, Ser. No. 155,703
Claims priority, application Japan, Jun. 24, 1985, 60-137289
Int. Cl.[4] C04B *33/32*
U.S. Cl. 264—65 **3 Claims**

1. The method which comprises

(a) forming a shaped article of polysilazene,

(b) contacting the shaped article of step (a) with dry ammonia while the shaped article is maintained at a temperature within the range of 20°–200° C. to effect infusibilization, and

(c) subjecting the ammonia-treated product resulting from step (b) to further heat treatment at a higher temperature in a nitrogen atmosphere to thereby produce a shaped ceramic article.

4,873,040

METHOD FOR PRODUCTION OF PILED MATS WITH A RUBBER BACKING ON A VULCANIZING PRESS

Aage Lang, Kolind, Denmark, assignor to Milliken Research Corporation, Spartanburg, S.C.

Filed Oct. 13, 1988, Ser. No. 256,965
Claims priority, application Denmark, Jun. 30, 1988, 3643/88
Int. Cl.[4] B29C *39/12*
U.S. Cl. 264—102 **1 Claim**

1. Method to produce a rubber-backed pile mat article on a vulcanizing press with a stationary heater plate using an intermittently operated heat conducting conveyor belt comprising the steps of: placing a first article on the conveyor belt at a first mold station for feeding and removing articles, then indexing the conveyor belt to move the article into the vulcanizing press, then vulcanizing the first article in the vulcanizing press and placing a second article on the conveyor belt at the first work station, then indexing the conveyor belt in the same direction as with the first article to move the second article into the vulcanizing press and the first article into a first cooling and degassing station, then vulcanizing the second article in the vulcanizing press, cooling and degassing the first article, and placing a third article on the conveyor belt at a second work station for feeding and removing articles downstream of the first cooling and degassing zone, then reversing the conveyor belt to move the second article to a second cooling and degassing station upstream of the first work station and to place the first article in the first work station and the third article in the vulcanizing press, then vulcanizing the third article while removing the first article from the first work station, cooling and degassing the second article, and placing a fourth unvulcanized article on the conveyor belt at the first work station, then reversing the conveyor belt to move the second article into the first work station, the fourth article into the vulcanizing press and the third article into the first cooling and degassing station, then vulcanizing the fourth article while cooling and degassing the third article and removing the second article from the first work station, then placing a fifth article on the conveyor belt in the first work station, then

indexing the conveyor belt in the same direction as the preceding step to place the fifth article into the vulcanizing press, the third article into the second work station, then vulcanizing the fifth article while cooling and degassing the fourth article and removing the third article from the second work station, then placing a fifth article on the conveyor belt in the first work station, then indexing the conveyor belt in the same direction as the preceding step to place the fifth article into the vulcanizing press, the fourth article into the first cooling and degassing station and the third article into the second work station, then vulcanizing the fifth article while cooling and degassing the fourth article and removing the third article from the second work station, then placing a sixth unvulcanized article on the conveyor belt in the second work station and repeating sequentially the enumerated steps to produce further vulcanized articles.

4,873,041

PROCESS FOR PRODUCING A MULTILAYER MOLDED ARTICLE

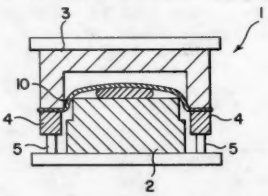
Syohei Masui, Kyoto; Masahito Matsumoto, Ibaraki, and Nobuhiro Usui, Takatsuki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Aug. 31, 1988, Ser. No. 238,857

Claims priority, application Japan, Aug. 31, 1987, 62-218457; Aug. 31, 1987, 62-218458

Int. Cl.[4] B29C *43/04, 43/18, 43/20;* B32C *27/00*

U.S. Cl. 264—135 **6 Claims**



1. A process for producing a multilayer molded article which comprises:

wetting a skin material comprising a fabric or a thermoplastic resin sheet as an outermost layer with at least one liquid material,

which is a volatile material and which is a liquid at room temperature and atmospheric pressure, state and a solution having a surfactant contained therein comprising a volatile material which is liquid in an ordinary state as a medium,

supplying the wet skin material between male and female molds,

supplying a thermoplastic resin melt between the molds and closing the molds to shape the thermoplastic resin melt against the wet skin material and thereby form the multilayer molded article comprising the integrally adhered skin material and the thermoplastic resin, wetting, of the skin material including wetting of the outermost layer to the extent that increase of the temperature of the skin material and excess penetration of the skin material are prevented during shaping of the thermoplastic melt, thereby preventing deterioration of the feeling and warping of the molded article.

4,873,042

PROCESS FOR EXTRUDING A THERMOPLASTIC COPOLYMER

Barry Topcik, Bridgewater, N.J., assignor to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Mar. 25, 1988, Ser. No. 173,148

Int. Cl.[4] B29C *35/02, 47/78, 71/00*

U.S. Cl. 264—211.24 **7 Claims**

1. A process for extruding a hydrolyzable particulate thermoplastic copolymer, comprising (i) coating the copolymer with an organic peroxide, which, will provide essentially no crosslinking per se, but will decompose to provide a silanol condensation catalyst; (ii) passing the coated polymer through an extruder having a die at its downstream end; (iii) maintaining the temperature of the extruder upstream of the die at a level sufficient to extrude the copolymer, but below the decomposition temperature of the organic peroxide; (iv) maintaining the temperature at the die or downstream of the die at or above the decomposition temperature of the organic peroxide; and (v) providing sufficient moisture at the die or downstream of the die to crosslink the copolymer in the presence of a silanol condensation catalyst.

4,873,043

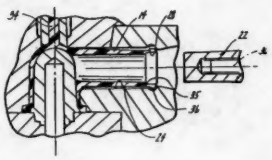
METHOD INJECTION MOLDED A PLASTIC PART WITH A ROUND TUBULAR PORTION

Marvin L. Meyers, Erie, Pa., assignor to Hoover Universal, Inc., Ann Arbor, Mich.

Filed Mar. 25, 1988, Ser. No. 173,145

Int. Cl.[4] B29C *45/40*

U.S. Cl. 264—237 **1 Claim**



1. The method of forming a plastic part having a tubular portion with an internal surface at a terminal end thereof having alternating ridges and grooves so as to eliminate a continuous inner surface at the terminal end of the tubular portion and thereby form a substantially symmetrical saw tooth shape to insure roundness of the tubular portion at the terminal end:

(a) providing an injection mold having a cavity formed with a cylindrical surface portion having an outer end section and a core member removably inserted in said cylindrical portion and configured to be in a spaced relation with said cylindrical surface portion, said core member having an annular outer surface portion formed of alternating ridges and grooves when said core member is inserted in said cylindrical portion to assemble said mold,

(b) injecting a molten plastic material into said cavity so that the material extends into said cylindrical portion and around said core member,

(c) withdrawing said core member from said cylindrical portion along a line extending axially of said cylindrical portion after the plastic material in said cylindrical portion has solidified enough to retain its tubular shape and before it has completely cooled to thereby enable said plastic material to shrink radially inwardly away from said cylindrical surface;

(d) thereafter withdrawing said tubular shape form said cylindrical portion in a direction axially of said tubular shape; and

(e) cooling the part to room temperature, the symmetrical discontinuous inner surface of said tubular portion at the

terminal end of the part insuring an even shrinking of said tubular portion at said terminal end to thereby insure the roundness of said tubular portion at said terminal end.

4,873,044

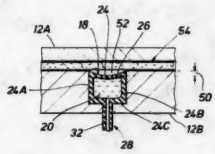
METHOD AND APPARATUS FOR REDUCTION OF MOLD CYCLE TIME

Joseph N. Epel, Southfield, Mich., assignor to Shell Oil Company, Houston, Tex.

Filed Dec. 21, 1987, Ser. No. 136,061

Int. Cl.[4] B29C *45/56, 39/40*

U.S. Cl. 264—257 **2 Claims**



2. A method for reducing the fabrication time of a molded article of manufacture wherein a portion of said molded article is formed by a hardenable liquid, said method including the steps of:

providing a mold having two mold section surfaces with at least one hardenable liquid injection port defined therethrough in at least one of said surfaces, said mold surface having at least one opening defined downwardly therein extending outwardly away from said hardenable liquid injection port,

locating a deflatable member within said opening, said deflatable member having at least one fluid chamber containing fluid defined in the interior thereof, said deflatable member having a thickened wall contacting the sides of said opening and a moveable wall positionable flush with one of said mold section surfaces,

placing fluid movement means in fluid communication with said at least one fluid chamber,

placing a filament matrix in the mold and positioning a majority of both surfaces of said filament matrix adjacent said mold section surfaces,

removing said fluid from said fluid chamber so as to move said moveable wall inward a selected distance relative to one of said mold section surfaces, thereby defining a channel to accelerate flow of portions of said hardenable liquid beneath said filament matrix means,

flowing hardenable liquid into said mold,

adding fluid to said fluid chamber to move said moveable wall surface flush with said mold section surface,

retaining said hardenable liquid in said mold for a sufficient period for said liquid to wet said filament matrix and to harden sufficiently to dimensionally stabilize said article of manufacture, and

removing said article of manufacture from said mold.

4,873,045

METHOD FOR MANUFACTURING AUTOMOTIVE INTERIOR COMPONENTS

Zenzo Fujita, Fujisawa; Hirokiyo Morita, Atsugi, and Sadao Morishita, Ebina, all of Japan, assignors to Kasai Kogyo Co., Ltd., Tokyo, Japan

Filed Mar. 24, 1988, Ser. No. 172,407

Claims priority, application Japan, Jul. 14, 1987, 62-175460

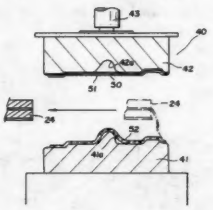
Int. Cl.[4] B29C *43/20*

U.S. Cl. 264—259 **4 Claims**

1. Method for cold press manufacturing automotive interior component parts, comprising the steps of:

positioning a skin layer, having a back liner consisting of a foamed cushioning layer, on a mold surface of an upper cold press mold with the cushioning layer facing downward;

extruding a sheet of semi-molten thermoplastic resin material serving as a core layer directly onto a mold surface of a lower cold press mold; and



cold pressing by clamping together the upper mold and the lower mold in such a manner that the core layer and the skin layer are bonded together with the cushioning layer interposed therebetween, wherein the upper mold and the lower mold are at temperatures of from room temperature to 60° C. and the press pressure is from 30 to 50 kg/cm^2.

4,873,046

PRODUCTION OF STRETCHED ION-EXCHANGE MEMBRANE

Janusz J. H. Krause; Peter J. Smith, both of Northwhich, and Robin A. Woolhouse, Bunbury, Nr Taporley, all of England, assignors to Imperial Chemical Industries PLC, London, England

Continuation of Ser. No. 466,145, Feb. 14, 1983, abandoned.

This application Aug. 17, 1987, Ser. No. 85,786

Claims priority, application United Kingdom, Feb. 17, 1982, 8204575

The portion of the term of this patent subsequent to Oct. 14, 2003, has been disclaimed.

Int. Cl.[4] B29C *55/00;* B29B *17/00*

U.S. Cl. 264—288.4 **14 Claims**

1. A method of producing an ion-exchange membrane of an organic polymer containing ion-exchange groups or groups convertible to ion-exchange groups in which method the membrane is expanded to increase the surface area per unit weight of the membrane, characterized in that a film of the membrane is heated at an elevated temperature and the membrane is stretched at the elevated temperature in order to effect an increase of at least 100% in the surface area per unit weight of the membrane.

4,873,047

SHAPING ANODIC ALUMINUM OXIDE SHEET

Dianne M. Jenkins, Leamington Spa, and Christopher Pargeter, Banbury, both of England, assignors to Alcan International Limited, Montreal, Canada

Filed Nov. 9, 1987, Ser. No. 118,724

Claims priority, application United Kingdom, Nov. 11, 1986, 8626853

Int. Cl.[4] C04B *35/10*

U.S. Cl. 264—322 **18 Claims**

1. A method of forming into a desired shape an anodic aluminium oxide sheet, which method comprises wetting the sheet, forming the wetted sheet into the desired shape, and drying the sheet in that shape.

4,873,048

METHOD FOR THE FORMATION OF A HOLE IN A PLASTIC PIPE

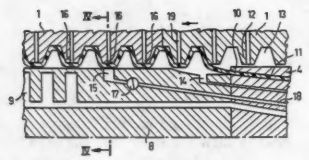
Jyri Järvenkylä, Salpakangas, Finland, assignor to Oy Uponor AB, Nastola, Finland

Continuation of Ser. No. 889,325, Jul. 23, 1986, abandoned. This application Jul. 7, 1988, Ser. No. 217,083

Claims priority, application Finland, Jul. 24, 1985, 852886

Int. Cl.[4] B29C *49/04, 49/38*

U.S. Cl. 264—504 5 Claims



1. A method of forming a hole in a corrugated plastic pipe, comprising the steps of:

providing a mandrel;

feeding a plastic layer for forming said corrugated plastic pipe from a nozzle located at one end of the mandrel into an elongated mould cavity between an outermost surface of the mandrel and inner surfaces of chill molds which are displaced along the mandrel and which define a corrugated pattern; pressing all of the plastic layer into the chill mould with a pressure medium between the outermost surface of the mandrel and an inner surface of the plastic layer, thereby forming corrugations in said plastic layer, said corrugations having adjacent regions of crests and troughs; displacing the corrugated plastic layer with the chill moulds along the mandrel to an opening in the outermost surface of the mandrel; covering said opening in said mandrel and sealing around the edges of the opening in said mandrel with the plastic layer forming one of said troughs, said sealing arising from having the distance between the corresponding trough forming portion of said chill mound and the outermost surface of said mandrel surrounding said opening correspond to the thickness of the portion of the plastic layer forming said one of said troughs, said sealing being effective to prevent pressure from a pressure medium emanating from said opening from reaching areas of the plastic layer adjacent said one of said troughs; and, then subjecting only the portion of the plastic layer covering said opening in the mandrel to a local pressure difference exceeding a breaking limit of the plastic layer, said pressure difference being applied between the inner surface and opposite outer surface of the plastic layer at the location of said one of said troughs, said pressure difference at least in part arising from a pressure medium emanating from the opening in the mandrel, said pressure difference forming a hole through the plastic layer at the location of said one of said troughs thereby allowing said pressure medium to be released through said hole formed in said plastic layer and then through an opening in said trough forming portion of said chill mould, said pressure medium being selected from the group consisting of gas and liquid.

4,873,049

MOLDING OUTER AND INNER SOLES ONTO SHOE UPPERS

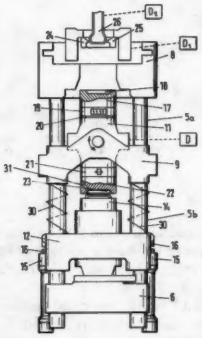
Reinhard Landwehr, Achim, and Günter Rebers, Achim-Baden, both of Fed. Rep. of Germany, assignors to Klöckner Ferromatik Desma GmbH, Malterdingen, Fed. Rep. of Germany

Division of Ser. No. 116,361, Nov. 4, 1987, Pat. No. 4,801,256. This application Jul. 12, 1988, Ser. No. 217,965

Claims priority, application Fed. Rep. of Germany, Nov. 5, 1986, 3637697; Dec. 20, 1986, 3643821

Int. Cl.[4] B29C *39/04*

U.S. Cl. 264—513 3 Claims



1. A process for molding outer and inner soles on to shoe uppers, comprising the steps of forming a molded outer sole by injecting molding an elastomer into a mold cavity defined by a heatable first mold part at one end of a pivotable and axially movable mold carrier and an axially movable confronting mold plate, the injection molding being carried out while pressing said carrier against a stationary support by moving said mold plate into a mold closing position against said mold part, releasing the molded outer sole on to said mold plate by shifting said carrier away from said support and separating said mold part into a mold opening position, pivoting said mold carrier such that a cooled second mold part at an opposite end thereof overlies the molded outer sole, transferring the molded outer sole to said second mold part, pivoting said mold carrier to confront the molded outer sole to a last supported shoe upper located adjacent said support, forming an inner sole mold cavity with the molded outer sole by disposing said last supported shoe upper adjacent the molded outer sole and by closing an opposed pair of lateral mold elements about the shoe upper, forming a molded inner sole by injection molding a mixture of isocyanate and a polyol reacting into polyurethane into said inner sole mold cavity, and thereby bonding the molded inner sole to the shoe upper, the elastomer containing additives of reactive end groups of substances to effect chemical bonding with the isocyanate.

4,873,050

METHOD AND APPARATUS FOR PRESSURE RELIEF OF A NUCLEAR POWER PLANT

Bernd Eckardt, Bruchkoebel, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Mar. 22, 1988, Ser. No. 171,656

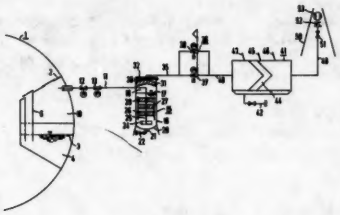
Claims priority, application Fed. Rep. of Germany, Mar. 23, 1987, 3709471; Sep. 3, 1987, 3729501

Int. Cl.[4] G21C *9/00;* G21F *9/02*

U.S. Cl. 376—283 19 Claims

1. Method for pressure relief of a nuclear power plant, which comprises feeding fluid from an outlet opening of a containment through a filter to a stack, exposing the filter to pressure in the containment, filtering moisture and collecting mist at the

filter, passively decreasing pressure downstream of the filter at a throttle device with a critical relaxation for a uniform



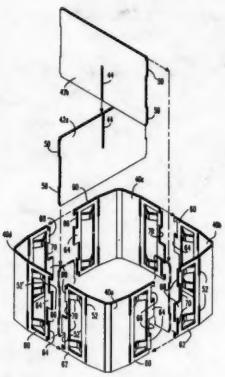
throughput, and providing a pressure drop upstream of the filter which is at most half as great as a pressure drop downstream of the filter.

4,873,051

NUCLEAR FUEL GRID OUTER STRAP

Robert Duncan, Fork, and James E. Craver, Lexington, both of S.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 6, 1988, Ser. No. 178,723
Int. Cl.[4] G21C *3/34*
U.S. Cl. 376—438 23 Claims



1. A nuclear reactor fuel assembly grid comprising:

a. a first outer grid strap segment end, said first end having a first tab arranged in substantially the same plane as the plane defined by said first end;

b. a second outer grid strap end, said second end having a second slot arranged in substantially the same plane as the plane defined by said second end, with said tab being substantially disposed in said slot, defining a socket therebetween; and

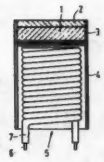
c. a fork tine interposed substantially perpendicularly in said socket.

4,873,052

METHOD OF MANUFACTURING A SCANDATE DISPENSER CATHODE AND SCANDATE DISPENSER CATHODE MANUFACTURED ACCORDING TO THE METHOD

Jan Hasker; Johannes Van Esdonk, both of Eindhoven, and Wim Kwestroo, Lieshout, all of Netherlands, assignors to U.S. Philips Corporaton, New York, N.Y.

Continuation of Ser. No. 689,542, Jan. 7, 1985, abandoned. This application Aug. 22, 1986, Ser. No. 899,788
Claims priority, application Netherlands, Oct. 5, 1984, 8403031
Int. Cl.[4] C22C *29/12*
U.S. Cl. 419—2 4 Claims



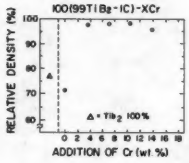
1. A method of manufacturing a scandate dispenser cathode having a matrix at least the top layer of which consists substantially of a mixture of tungsten (W) with scandium oxide (Sc_2O_3) or with a mixed oxide comprising scandium oxide, characterized in that the matrix is sintered at a temperature between 1300° and approximately 1500° C. in hydrogen.

4,873,053

METHOD FOR MANUFACTURING A METAL BORIDE CERAMIC MATERIAL

Junichi Matsushita; Hajime Saito, both of Nagoya, and Hideo Nagashima, Tokyo, all of Japan, assignors to STK Ceramics Laboratory Corp. and Toshiba Ceramics Co., Ltd., both of, Japan

Filed Feb. 12, 1988, Ser. No. 155,604
Claims priority, application Japan, Feb. 20, 1987, 62-35475; Feb. 20, 1987, 62-35476
Int. Cl.[4] G22F *1/00*
U.S. Cl. 419—11 20 Claims



1. A method for manufacturing a metal boride ceramic material, comprising mixing metal boride powder with 1–20 wt. % metal powder and 0.1–10 wt. % carbon powder to thereby make a mixture, shaping the mixture and firing it.

4,873,054

THIRD ELEMENT ADDITIONS TO ALUMINUM-TITANIUM MASTER ALLOYS

Geoffrey K. Sigworth, Reading, Pa., assignor to KB Alloys, Inc., Sinking Spring, Pa.

Continuation-in-part of Ser. No. 904,511, Sep. 8, 1986, Pat. No. 4,812,290. This application Mar. 7, 1988, Ser. No. 165,036
Int. Cl.[4] C22C *1/00, 21/00*
U.S. Cl. 420—552 22 Claims

1. An aluminum-titanium master alloy consisting essentially

of, in weight percent, any two or more elements selected from the group consisting of carbon about 0.003 up to 0.1, sulfur about 0.03 up to 2, phosphorus about 0.03 up to 2, nitrogen about 0.03 up to 2, and boron about 0.01 up to 0.4, titanium 2 to 15, and the balance aluminum plus impurities normally found in master alloys, wherein said master alloy is substantially free of carbides, sulfides, phosphides, nitrides, and borides greater than about 5 microns in diameter.

4. A method of making an aluminum-titanium master alloy comprising the steps of:

preparing an alloy consisting essentially of, in weight percent, any two or more elements selected from the group consisting of carbon about 0.003 up to 0.1, sulfur about 0.03 up to 2, phosphorus about 0.03 up to 2, nitrogen about 0.03 up to 2, and boron about 0.01 up to 0.4, titanium 2 to 15, and the balance aluminum plus impurities normally found in master alloys;

superheating the alloy to a temperature and for a time sufficient to place said any two or more elements into solution in the alloy; and

casting the alloy to produce a master alloy consisting essentially of, in weight percent, any two or more elements selected from the group consisting of carbon about 0.003 up to 0.1, sulfur about 0.03 up to 2, phosphorus about 0.03 up to 2, nitrogen about 0.03 up to 2, and boron about 0.01 up to 0.4, titanium 2 to 15, and the balance aluminum plus impurities normally found in master alloys, wherein the alloy is substantially free of carbides, sulfides, phosphides, nitrides, and borides greater than about 5 microns in diameter.

4,873,055

CORROSION RESISTANT FE-NI-CR ALLOY

John H. Culling, St. Louis, Mo., assignor to Carondelet Foundry Company, St. Louis, Mo.

Filed Dec. 20, 1988, Ser. No. 287,839

The portion of the term of this patent subsequent to Jan. 3, 2006, has been disclaimed.

Int. Cl.[4] C22C *30/00*

U.S. Cl. 420—582 **14 Claims**

1. An alloy consisting essentially of

Nickel	19–30% by weight
Chromium	19–27%
Molybdenum	0.3–1%
Copper	2.7–4.5%
Manganese	2.7–4.7%
Silicon	2.7–5.5%
Carbon	up to about 0.08%
Columbium	up to about 0.7%
Tantalum	up to about 1% substituted for part of Cb at the rate of 1% Ta = 0.5% Cb
Nitrogen	up to about 0.12%
Tungsten	up to about 0.6%
Cobalt	up to about 0.8%
Iron	essentially balance

4,873,056

CHEMICAL TEST KIT FOR DETECTING IMPURITIES IN AN OIL SAMPLE

David J. Fisher, North Adams, Mass., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.

Continuation of Ser. No. 529,154, Sep. 2, 1983, Pat. No. 4,686,192. This application May 15, 1987, Ser. No. 50,924

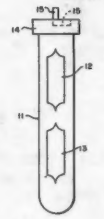
Int. Cl.[4] G01N *31/22*

U.S. Cl. 422—61 **19 Claims**

1. A kit for detecting the presence of chloride ions and polychlorinated biphenyls at above a predetermined total threshold concentration in an oil sample comprising:

(a) a first container for receiving an oil sample and for receiving an aqueous liquid phase and further including at least one breakable capsule mounted within said first container, said breakable capsule containing a predetermined amount of an alkali metal and said first container including means for withdrawing said liquid phase from said first container; and

(b) a second container comprising at least two breakable capsules mounted within said second container, and further including an aqueous liquid phase surrounding said capsules, one of said capsules containing a predetermined



amount of mercury titrant which reacts with chloride ions and the other of said capsules containing a predetermined amount of dye indicator which reacts with mercuric ions;

wherein said respective predetermined amounts of alkali metal, mercury titrant and dye indicator are sufficient to allow visual detection in the presence of said chloride ions and polychlorinated biphenyls above said predetermined threshold concentration in said oil sample.

4,873,057

APPARATUS FOR CARRYING OUT A TITRATION PROCEDURE FOR THE CHEMICAL ANALYSIS OF A SAMPLE

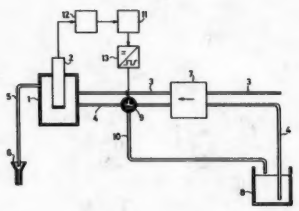
Peter M. Robertson, Winkel b. Buelach, and Erwin Suter, Zurich, both of Switzerland, assignors to Zellweger Uster Ltd, Uster, Switzerland

Filed Mar. 10, 1987, Ser. No. 27,001

Claims priority, application Switzerland, Mar. 11, 1986, 994/86

Int. Cl.[4] G01N *31/16*

U.S. Cl. 422—75 **16 Claims**



1. Apparatus for chemically analyzing a sample by fluid titration comprising:

(a) a titration vessel;

(b) means for sensing the titration equivalence point of the contents of the titration vessel;

(c) a first supply line connected to a source of sample fluid and the titration vessel for supplying sample fluid to the titration vessel;

(d) a second supply line connected to a reservoir of a reagent fluid and the titration vessel for supplying reagent fluid to the titration vessel;

(e) means for supplying one of said sample and reagent fluids substantially continuously to said titration vessel through

one of said first and second supply lines and means for supplying the other of said fluids intermittently to the titration vessel through the other of said supply lines; (f) said means for supplying the other of said fluids intermittently including valve means located in the supply line for said other fluid; and

(g) control means connected to the valve means for controlling opening and closing of the valve means to obtain a pulse flow with the frequency and duration of the pulses providing a ratio of average sample fluid flow rate to average reagent fluid flow rate sufficient to achieve the ratio of sample fluid to reagent fluid at the equivalence point.

4,873,058

FLOW DIVIDER FOR GAS CHROMATOGRAPHS

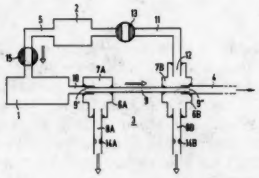
Kraft-Ulrich Arnold, Karlsruhe, Fed. Rep. of Germany, and Fernand Clauss, Beinheim, France, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Mar. 1, 1988, Ser. No. 162,538

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1987, 3708584

Int. Cl.[4] G01N *30/02*

U.S. Cl. 422—89 **1 Claim**



1. A flow divider system for use in gas chromatographs and adapted to be connected to a sample dispenser, a separation column and a source of carrier gas, comprising:

upstream and downstream flow dividers, each having a split chamber, an inlet, an outlet, and a choked port, the inlet of the upstream flow divider being connected to the sample dispenser, the outlet of the upstream flow divider adapted to be connected to the inlet of the downstream flow divider, and the outlet of the downstream flow divider being connected to the separation column;

means for connecting and disconnecting the source of carrier gas with the split chamber of the downstream flow divider.

4,873,059

PIPETTE DEVICE

Keishiro Kido, and Yoshio Saito, both of Saitama, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 17, 1986, Ser. No. 942,750

Claims priority, application Japan, Dec. 20, 1985, 60-286995

Int. Cl.[4] B01L *3/02*

U.S. Cl. 422—100 **6 Claims**

1. A pipette device comprising:

(i) a vertical housing,

(ii) a cylinder member having a pipette tip fitting section at the lower end thereof to which a removalable pipette tip is fitted, for receiving and issuing liquid, disposed at least at a lower section of said housing so as to be vertically slidable in said housing and extending vertically past a lower end of said housing;

(iii) means for upwardly biasing said cylinder member,

(iv) a piston member having a lower end portion vertically slidable in said cylinder member,

(v) means for upwardly biasing said piston member, and

(vi) an engagement member for engaging said piston member with said cylinder member,

wherein said engagement member engages said piston member with said cylinder member when said piston member moves down to an engagement position, lower by a predetermined distance than a top position within the movement range of said piston member in said cylinder member, and wherein thereafter said cylinder member is moved vertically together with said piston

member against a combined upward bias of said means for biasing said cylinder member and said means for biasing said piston member, in said housing while said piston member is moved vertically between said engagement position and a position lower than said engagement position.

4,873,060

PROCESS FOR THE PREPARATION OF AROMATIC POLYESTERS AND APPARATUS FOR CARRYING OUT THIS PROCESS

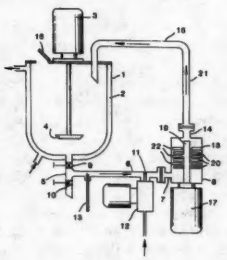
Werner Rieder, Vienna, Austria, assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 342,007, Jan. 18, 1982, Pat. No. 4,401,803. This application Jun. 28, 1983, Ser. No. 508,723

Claims priority, application Austria, Jun. 26, 1980, 3344/80

Int. Cl.[4] B01F *7/22*; B01J *19/18*; C08F *2/00*

U.S. Cl. 422—135 **1 Claim**



1. An apparatus for polycondensation of diphenols and aromatic dicarboxylic acid halides comprising a reactor provided with a stirring means and connected to a dispersing means by a feed means and a recycle means, said dispersing means comprising means defining a plurality of mixing stages in series to be passed by a liquid reaction mixture fed to the dispersing means via the recycle means, whereby in each mixing stage there are means for dividing the reaction mixture into

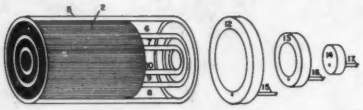
several streams, the flow boundaries of the streams thereby carrying out motions transversely to the main direction of the reaction-mixture-flow at mean velocities greater than 5 m/second and mixing chamber means with at least one outlet channel, the apparatus further comprising means for introducing a solution of aromatic dicarboxylic acid halide in an organic solvent into the recycle means before entry into the dispersing means.

4,873,061

FIXATION OF NITROGEN BY SOLAR ENERGY

Louis R. O'Hare, 1066 A County Rd. 335, Pagosa Springs, Colo. 81147

Filed Jan. 13, 1988, Ser. No. 143,371
Int. Cl.[4] C01B *21/24, 21/30;* F24J *2/26*
U.S. Cl. 422—188 **15 Claims**



1. A solar powered chemical reactor for reacting nitrogen and other reactants to provide products of combined compounds comprising;

(1) a primary solar energy gas heater in the form of porous material in physical contact with a flow of gases being heated and flowing through the pores of the material, said porous material being capable of absorbing intense concentrated solar radiation and of converting said radiation to thermal energy, and

(2) rapidly acting, double heat transfer means each of which means being capable of contacting said gas flow immediately after leaving said pores and of immediately absorbing heat energy from the gas flow in order to fix the equilibrium percentage of combined compound products formed at the temperatures of the absorber in a first time period, said heat transfer means in a second, alternate time period each being also capable of transferring said heat absorbed from solar heated gases to reactant gases about to be heated by said primary gas heater, each one of said double heat transfer means being capable of acting alternately in time with the other heat transfer means, and each of said heat transfer means being in the form of a set of metal tubes with open ends immediately adjacent to but not contacting said porous absorber, said tubes being capable of providing fluid flow communication between the solar absorber and

(3) a gas flow direction reversal means in the form of electric valving and a valve current interrupter capable of intermittently energizing said valving thereby to repeatedly alternate said valving between two conditions, one condition being the provision of series fluid flow communication from a source of gas reactants through a first set of heat transfer tubes and a solar absorber to a second set of heat transfer tubes and to a product output duct, the second valve condition being the provision of series fluid flow communication from the source of reactant gases through the second set of heat transfer tubes and then through the solar absorber and through the first set of heat transfer tubes and then to the product output duct, and

(4) a multiple chamber, heat resistant housing having seals with conduit ports on one end, said housing being capable of supporting the sets of heat transfer tubes in separate cavities and of directing gas flow through said sets of tubes and through said solar radiation absorber in such a manner that said housing provides series fluid flow communication through one set of heat transfer tubes then the absorber and the other set of tubes,

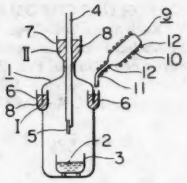
(5) reactant and product gas circulation means in the form of a vacuum/pressure pump capable of moving gas from a source, through said valving for repeatedly reversing flow direction, through the heat transfer tubes and absorber and into an output duct.

4,873,062

APPARATUS FOR THE GROWTH OF SINGLE CRYSTALS

Toshihiro Kotani, and Kohji Tada, both of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Jun. 28, 1984, Ser. No. 625,537
Claims priority, application Japan, Aug. 6, 1983, 58-144149; Aug. 6, 1983, 58-144150
Int. Cl.[4] B01D *9/00*
U.S. Cl. 422—249 **7 Claims**



1. In an apparatus for the Czochralsky growth of compound single crystals wherein a single crystal seed held by a pull rod is provided in a sealed vessel which vessel has a closed end and an opened end sealed by immersion of the open end of the vessel in a B_2O_3 melt and which contains therein a crucible containing a raw material melt of the compound and an atmosphere of a volatile element of the compound, the improvement wherein at least the inner surface of the sealed vessel is made of a heat resistance material having a melting point of at least 1400° C., selected from the group consisting of pyrolytic and aluminum nitride, boron nitride,

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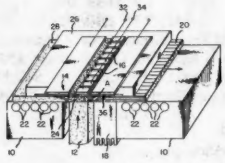
4,873,063

APPARATUS FOR ZONE REGROWTH OF CRYSTAL RIBBONS

Carl E. Bleil, 132 Chalmers Dr., Rochester, Mich. 48063

Continuation-in-part of Ser. No. 826,596, Feb. 6, 1986, Pat. No. 4,775,443, and a continuation-in-part of Ser. No. 816,424, Jan. 6, 1986, Pat. No. 4,749,438. This application Mar. 28, 1988, Ser. No. 172,760
Int. Cl.[4] C30B *35/00*
U.S. Cl. 422—250 **21 Claims**



1. An apparatus for forming a crystalline ribbon from a source body of material, comprising:

means for supporting a film of material in a plane;

heating means comprising generally planar electrodes parallel to the said plane for producing electrical currents in the material causing a planar film of material to melt along a zone in the source body,

means for controllably removing heat from the melted planar film of material in a direction substantially perpendicular to the plane to effect ribbon growth,

means for causing relative motion in a direction substantially

parallel to the film between the ribbon and the heating means; and

means for replenishing the melted film.

4,873,064

POWDER OF COAGULATED SPHERICAL ZIRCONIA PARTICLES AND PROCESS FOR PRODUCING THEM

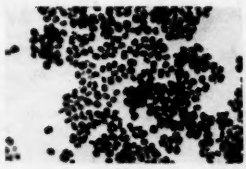
Etsuro Kato, Aichi, Japan, assignor to Nissan Chemical Industries, Ltd., Tokyo, Japan

Filed Mar. 4, 1986, Ser. No. 836,143

Claims priority, application Japan, Mar. 4, 1985, 60-42098

Int. Cl.[4] C04B *35/48*

U.S. Cl. 423—85 14 Claims



3. A process for producing calcined powder of coagulated spherical particles having a uniform secondary coagulated particle size of 0.2 μm to 3 μm and composed of primary particles of less than 500 Å in the crystallite size comprising:

(a) hydrolyzing an aqueous solution of a zirconia salt under heating at a temperature from 90° to 250° C. and separating coagulated zirconia particles of greater than about 1000 Å in coagulated particle size from coagulated zirconia particles composed of ultrafine monoclinic primary particles of less than 100 Å in the crystallite size coagulated with each other prepared by the hydrolysis;

(b) adding a zirconium salt and water to the thus separated coagulated particles to prepare an aqueous suspension having a pH lower than 1;

(c) hydrolyzing the aqueous suspension under heating at a temperature from 90° to 250° C. to grow the particles and increase the particle size and thereafter, repeating once or more the procedures of adding the zirconium salt and applying hydrolysis under heating at a temperature from 90° to 250° C., thereby growing the particles into spherical particles of essentially uniform particle size within a range from 0.2 μm to 3 μm and separating the thus grown particles from the aqueous suspension;

(d) drying the particles separated from the aqueous suspension to obtain a powder of ultrafine zirconia particles; and

(e) calcining said ultrafine zirconia particles with or without other metal compounds at a temperature of less than 1000° C., and pulverizing the obtained calcined product.

4,873,065

FLUE GAS PURIFICATION PROCESS

Hartmut Braun, and Hubert Vogg, both of Karlsruhe, Fed. Rep. of Germany, assignors to Kernforschungszentrum Karlsruhe GmbH, Karlsruhe, Fed. Rep. of Germany

Filed Apr. 22, 1987, Ser. No. 41,293

Claims priority, application Fed. Rep. of Germany, May 2, 1986, 3614814

Int. Cl.[4] B01D *47/05, 47/06*

U.S. Cl. 423—210 14 Claims

1. In a process for purifying flue gas generated by the combustion of waste materials, the flue gas being comprised of solid particulates, polluting gases including HCl, heavy metal vapors including Hg, and water vapor, the process including the steps of:

a. separating the majority of solid particulates from the flue gas in a dry solids separation system and collecting the solid particulates as flue ash;

b. scrubbing from the flue gas the solid particulates remaining in the flue gas leaving the dry solids separation system and condensing polluting gases, heavy metal vapors, and water vapor from the flue gas leaving the dry solids separation system in a condensation/scrubbing system to form a condensate; and

c. extracting soluble heavy metals from the flue ash with the condensate to produce a purified flue ash, the improvement comprising:

subjecting the condensate from the scrubbing step to a first heavy metal separating process which is an ion exchange process and which selectively removes at least Hg from the condensate prior to the extracting step.

4,873,066

LOW TEMPERATURE PROCESS FOR THE REDUCTION OF NITRGEN OXIDES IN AN EFFLUENT

William R. Epperly, New Canaan; James C. Sullivan, Norwalk, and Barry N. Sprague, Bethlehem, all of Conn., assignors to Fuel Tech, Inc., Stamford, Conn.

Continuation-in-part of Ser. No. 207,382, Jun. 15, 1988, which is a continuation-in-part of Ser. No. 50,198, May 14, 1987, Pat. No. 4,780,289, and a continuation-in-part of Ser. No. 90,962, Aug. 28, 1987, abandoned, and a continuation-in-part of Ser. No. 207,292, Jun. 15, 1988, Pat. No. 4,863,704, which is a continuation-in-part of Ser. No. 22,716, Mar. 6, 1987, Pat. No. 4,777,024, and a continuation-in-part of Ser. No. 90,962, Aug. 28, 1987, abandoned. This application Feb. 8, 1989, Ser. No. 308,255

Int. Cl.[4] C01B *21/00*

U.S. Cl. 423—235 10 Claims

1. A process for the reduction of the concentration of nitrogen oxides in the effluent from the combustion of a carbonaceous fuel, the process comprising introducing a treatment agent which comprises an ammonium salt selected from the group consisting of triammonium citrate and ammonium formate into the effluent at an effluent temperature below 1300° F.

4,873,067

ZEOLITE ZSM-57

Ernest W. Valyocsik; Nancy M. Page, both of Yardley, Pa., and Cynthia T-W. Chu, Princeton Junction, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 944,297, Dec. 19, 1986, abandoned, which is a continuation-in-part of Ser. No. 807,424, Dec. 10, 1985, abandoned, which is a continuation-in-part of Ser. No. 642,964, Aug. 21, 1984, abandoned, which is a continuation-in-part of Ser. No. 642,965, Aug. 21, 1984, abandoned, which is a continuation-in-part of Ser. No. 642,963, Aug. 21, 1984, abandoned, which is a continuation-in-part of Ser. No. 642,962, Aug. 21, 1984, abandoned, which is a continuation-in-part of Ser. No. 642,961, Aug. 21, 1984, abandoned, which is a continuation-in-part of Ser. No. 759,377, Jul. 26, 1985, abandoned, said Ser. No. 944,297, is a continuation-in-part of Ser. No. 759,377, which is a continuation-in-part of Ser. No. 642,964, which is a continuation-in-part of Ser. No. 642,965, which is a continuation-in-part of Ser. No. 642,963, which is a continuation-in-part of Ser. No. 642,962, which is a continuation-in-part of Ser. No. 642,961, which is a continuation-in-part of Ser. No. 642,930, Aug. 21, 1984, abandoned. This application Nov. 17, 1987, Ser. No. 121,544

Int. Cl.[4] C01B *35/10*

U.S. Cl. 423—279 11 Claims

1. A synthetic porous crystalline zeolite having a molar ratio of XO_2: Y_2O_3 of at least 4, wherein X represents silicon and/or germanium and Y represents aluminum, boron, chromium, iron and/or gallium, said porous crystalline zeolite having at least the X-ray diffraction lines as set forth in Table 1 of the specification.

4,873,068
PROCESS FOR MANUFACTURING TETRASODIUM PYROPHOSPHATE

Paul L. Hensler, Lawrence, Kans., assignor to FMC Corporation, Philadelphia, Pa.

Filed Sep. 28, 1988, Ser. No. 250,053
Int. Cl.[4] C01B *15/16, 25/26*
U.S. Cl. 423—315 **7 Claims**

1. A process for manufacturing tetrasodium pyrophosphate comprising forming a mixture of particles of sodium tripolyphosphate and a sufficient quantity of sodium carbonate or a sodium salt capable of forming sodium carbonate on heating below 700° C. to provide a mol ratio of sodium to phosphorus in the mixture of from 1.90 to 2.10, the particles of the mixture having a sufficient small size such that at least 95% by weight of the mixture will pass through a 180 micrometer sieve, maintaining the mixture at a temperature of from 300° C. to about 700° C. for a sufficient time to convert at least 95% of the mixture into sodium pyrophosphate without substantially agglomerating the particles.

4,873,069
METHOD FOR THE PREPARATION OF SILICON CARBIDE WHISKERS

Samuel C. Weaver, and Richard D. Nixdorf, both of Knoxville, Tenn., assignors to American Matrix, Inc., Knoxville, Tenn.

Continuation-in-part of Ser. No. 23,673, Mar. 9, 1987, abandoned. This application Dec. 15, 1988, Ser. No. 284,910
Int. Cl.[4] C01B *3/36*
U.S. Cl. 423—345 **15 Claims**

1. A method for producing a high yield of silicon carbide whiskers having diameters of about 0.5 to about 10 micrometers and lengths of about 10 to about 1000 micrometers, which comprises:

preparing a mixture of silicon dioxide particles and carbon fibers, said silicon dioxide particles having an average diameter of about 5 to 15 millimicrons and an average surface area of about 200 to 400 square meters per gram, said silicon dioxide particles being about 1.5 to about 2.75 times, by weight, said carbon fibers and said silicon dioxide having a void volume of about 40 percent to about 98 percent;

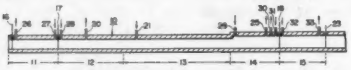
heating said mixture to a temperature of about 1600° to 1900° C. in a furnace for a time at least about 0.2 hours, followed by cooling to room temperature; and

maintaining gaseous reaction products of reactions between said silicon dioxide and said carbon fibers at the surface of said mixture at a steady state condition during said heating by flowing a substantially inert gas through said furnace.

4,873,070
PROCESS FOR PRODUCING SILICON CARBIDE WHISKERS

Kichiro Kaji; Katsunori Shimasaki, both of Kobe; Masakazu Yamamoto, Ikeda; Kozo Saiki; Keita Yura, both of Kobe; Hidetsugu Habata, Osaka; Isao Kimura, Suita, and Tetsuo Suzuki, Kobe, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Sep. 15, 1987, Ser. No. 96,473
Claims priority, application Japan, Dec. 20, 1986, 61-305123; Dec. 20, 1986, 61-305122; Dec. 27, 1986, 61-301970
Int. Cl.[4] C01B *31/36*
U.S. Cl. 423—345 **12 Claims**



1. A process for producing silicon carbide whiskers by heating molded silicon/containing starting material and carbon/containing starting material in a reaction vessel, the process comprising placing a powdery carbon/containing starting material around a molded silicon/containing starting material raising the temperature in the vessel to a temperature at which the carbon/containing starting material reacts with the molded silicon/containing starting material, and maintaining the concentration of hydrogen in the vessel at at least 70%.

4,873,071
GRAPHITE STRUCTURES AND METHOD FOR PRODUCTION THEREOF

Yasuhiro Yamada; Takeshi Imamura, both of Tosu; Hidemasa Honda, Suginami; Masaki Fujii, Chikushino, and Masanori Minohata, Sakai, all of Japan, assignors to Koa Oil Company, Limited Director General, Agency of Industrial Science Technology, Tokyo, Japan

Filed Apr. 28, 1988, Ser. No. 187,436
Int. Cl.[4] C01B *31/04*
U.S. Cl. 423—448 **4 Claims**

2. A method for making a graphite structure which is of light weight and excellent elasticity and has a packing density of 0.5 g/cm^3 or lowe and a recovery of 50% or higher at a compressibility of 10 to 90%, which comprises the steps of:

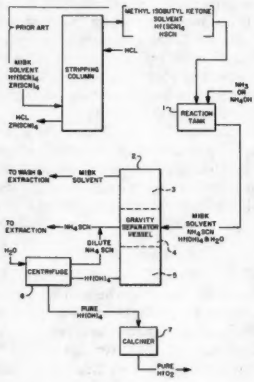
treating a carbonaceous material with nitric acid or a mixture of nitric and sulfuric acids, said carbonaceous material being a member selected from the group consisting of carbonaceous mesophases, cokes, and mixtures thereof and which has a hydrogen content of 2% by weight or higher; and

heat-treating the thus obtained product at a temperature of 2,400° C. or higher for graphitization.

4,873,072
RECOVERY OF HAFNIUM VALUES FROM LOADED EXTRACTION SOLVENT

Hani A. Abodishish, Ogden, Utah, assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 2, 1988, Ser. No. 240,184
Int. Cl.[4] C01G *27/02*
U.S. Cl. 423—608 **7 Claims**



1. In a process for recovering high purity hafnium hydroxide from a methyl isobutyl ketone organic solvent that is substantially free of sulfate ions and contains hafnium thiocyanate and thiocyanic acid, the improvement comprising reacting said organic solvent with ammonia to produce a reaction product in the form of a methyl isobutyl ketone organic solvent that is substantially free of sulfate ions and contains ammonium thiocyanate solution and hafnium hydroxide; separating the constituents of said reaction product in accordance with their

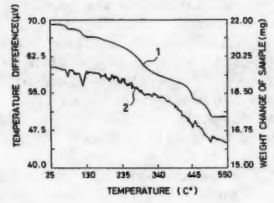
respective specific gravities to produce a hafnium hydroxide sludge as one of the separation products; and removing the liquid component of said sludge to yield a high purity hafnium hydroxide ready for calcination to hafnium oxide.

4,873,073

METHOD FOR PRODUCTION OF BISMUTH (III) OXIDE

Haruo Matsui, Nagoya; Ippei Nakagawa, Aichi, and Kiyotaka Kato, Seto, all of Japan, assignors to Agency of Industrial Science and Technology and Ministry of International Trade and Industry, both of Tokyo, Japan

Filed Mar. 7, 1989, Ser. No. 319,756
Claims priority, application Japan, Mar. 25, 1988, 63-72708
Int. Cl.[4] C01B 27/00
U.S. Cl. 423—617 6 Claims



1. A method for the production of spherical bismuth (III) oxide particles, which method consists essentially of adding a monocarboxylic acid to an aqueous solution containing trivalent bismuth ions thereby inducing formation of a bismuth-monocarboxylic acid complex in said solution, then adding an alkali to said solution thereby inducing precipitation of said complex therein, subsequently separating said precipitate from said solution, and firing the separated precipitate.

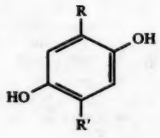
4,873,074

PROCESS FOR THE PREPARATION OF STABLE RADIODIAGNOSTIC PRODUCTS

Han-Lie Chia, Reinach; Horia Popescu, Basel, and Gabrielle Boehmer, Reinach, all of Switzerland, assignors to Solco Basel, Basel, Switzerland

Division of Ser. No. 125,608, Nov. 25, 1987. This application Jan. 31, 1989, Ser. No. 305,103
Claims priority, application Canada, Jul. 4, 1986, 2707/86
Int. Cl.[4] A61K 49/02; C07F 13/00; C07C 143/42
U.S. Cl. 424—1.1 11 Claims

1. A process for the preparation of a stable product which is labeled with the radionuclide Tc-99m and is used as a radiodiagnostic aid, which process comprises adding to a substance which is utilized as an organ-specific or tissue-specific carrier, before, during or after the labeling thereof using a pertechnetate and a reducing agent, a stabilizer of the formula:



(I)

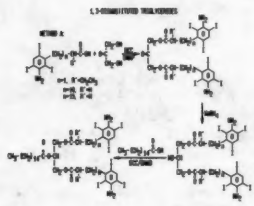
in which R denotes hydrogen, and R′ denotes a sulpho- or carboxymethyl group, or R and R′ each denote a sulpho- or a carboxymethyl group, or of a water-soluble salt thereof, in a concentration which is less than that of the carrier.

4,873,075

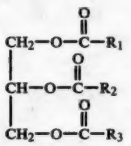
POLYIODINATED TRIGLYCERIDE ANALOGS AS RADIOLOGIC AGENTS

Raymond E. Counsell; Marc A. Longino; Jamey P. Weichert, and Susan P. Schwendner, all of Ann Arbor, Mich., assignors to The University of Michigan, Ann Arbor, Mich.

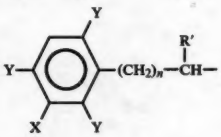
Filed Sep. 10, 1985, Ser. No. 774,498
Int. Cl.[4] A61K 49/02; C11C 3/02
U.S. Cl. 424—1.1 10 Claims



1. A compound selected from the group consisting of triglycerides of the general formula:



wherein R_1, R_2, and R_3 are each selected from the group consisting of saturated and unsaturated aliphatic hydrocarbon chains found in naturally occurring fatty acids, and iodophenyls of the general formula:



wherein X is selected from the group consisting of H, NH_2 and NHCOR″, R′ is selected from the group consisting of H and lower alkyls, R″ is a lower alkyl, n is an integer from 0–15, wherein at least two of said R^1, R_2, R_3 are said iodophenyls and wherein Y is selected from the group consisting of hydrogen or a radioactive isotope of iodine wherein at least one Y is a radioactive isotope of iodine.

4,873,076

METHOD OF SAFELY PROVIDING ANESTHESIA OR CONSCIOUS SEDATION

Jack Fishman, Miami, Fla.; John Arnold, Fairway, Kans.; Fred Sherman, Hollywood, and Jane Hsiao, Copper City, Fla., assignors to Baker Cummins Pharmaceuticals, Inc., Miami, Fla.

Continuation-in-part of Ser. No. 188,512, Apr. 29, 1988, abandoned. This application Apr. 6, 1989, Ser. No. 333,321
Int. Cl.[4] A61K 31/44, 31/55, 31/445, 47/00
U.S. Cl. 424—10 13 Claims

1. A method of inducing anesthesia or conscious sedation in a patient undergoing a surgical or exploratory procedure which comprises the intravenous administration to the patient of an effective amount of a benzodiazepine capable of inducing sedation or anesthesia and antegrade amnesia when injected

and an effective amount of an opiate analgesic prior to the performance of said procedure, followed by the parenteral administration to the patient of from about 1.0 to about 3.0 mg of a long-acting pure narcotic antagonist to counteract an observed drop in mean blood pressure, said antagonist being administered during the time interval commencing immediately after the procedure and continuing until about 3–5 hours after administration of the benzodiazepine and opiate.

4,873,077

LIQUID FIBER WRAP FINGERNAIL REINFORCEMENT COMPOSITION

Steven L. Thompson, 301 N. Pine Island Rd., Plantation, Fla. 33324, and Melvin K. Silverman, 1460 SE. 15th St., Fort Lauderdale, Fla. 33316

Filed Sep. 21, 1987, Ser. No. 99,200
Int. Cl.[4] A61K *7/04*
U.S. Cl. 424—61 **5 Claims**

1. A fingernail reinforcement composition, comprising:

a nitrocellulose-based nail lacquer having plasticizer, resin and solvent, and glass fibers suspended in said nail lacquer, in which the proportion of glass fiber to said nitrocellulose based formula is in the range of 1:3 to 1:8, and said glass fiber possesses dimensions of about 10 microns in diameter and about 800 microns in length.

4,873,078

HIGH-GLOSS, HIGH-SHINE LIPSTICK

Robert J. Edmundson, Germantown, and Terry C. Jacks, Memphis, both of Tenn., assignors to Plough, Inc., Memphis, Tenn.

Filed Apr. 22, 1988, Ser. No. 184,995
Int. Cl.[4] A61K *7/027, 7/025*
U.S. Cl. 424—64 **7 Claims**

1. A lipstick composition comprising from about 0.5 to about 8 weight percent of isohexadecane in a lipstick formulation.

4,873,079

HAIR COLORING COMPOSITION AND ITS METHOD OF USE

Charles R. Hahn, Cornwall-on-Hudson, N.Y., and Warren B. Shapiro, Norwalk, Conn., assignors to Clairol Incorporated, New York, N.Y.

Continuation of Ser. No. 88,163, Aug. 21, 1987, abandoned. This application Dec. 14, 1987, Ser. No. 132,500
Int. Cl.[4] A61K *7/13*
U.S. Cl. 424—70 **13 Claims**

1. A temporary or semipermanent hair coloring composition comprising an aqueous vehicle having incorporated therein a hair coloring component comprising one or more hair colorants selected from the group consisting of water-soluble temporary and water-soluble semipermanent hair colorants and mixtures thereof, in amount sufficient to color hair, said composition also containing as a cosolvent for said hair colorants from about 2 to about 15% by weight of a diol, said diol being selected from the group consisting of branched chain aliphatic hydrocarbon diols and having from 5 to 8 carbon atoms and bis(hydroxyalkyl) cycloalkanes having from 7 to 14 carbon atoms, said diol being present in said composition in a concentration to effectively function as a cosolvent for said hair colorants.

4,873,080

ORAL ANTI-DIABETIC PHARMACEUTICAL COMPOSITIONS AND THE PREPARATION THEREOF

Rolf Brickl, Warthausen; Gottfried Schepky, Biberach; Eckhard Rupprecht, Aulendorf-Tannhausen, and Andreas Greischel, Biberach, all of Fed. Rep. of Germany, assignors to Dr. Karl Thomae GmbH, Biberach an der Riss, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 616,010, May 31, 1984, Pat. No. 4,708,868. This application Sep. 30, 1987, Ser. No. 103,524
Claims priority, application Fed. Rep. of Germany, Jun. 8, 1983, 3320583
Int. Cl.[4] A61K *31/79, 31/745, 31/445, 31/40*
U.S. Cl. 424—80 **14 Claims**

1. The method of preparing an oral antidiabetic pharmaceutical composition containing an antidiabetic benzoic acid as the active ingredient, which comprises dissolving or emulsifying

(a) an acid antidiabetic benzoic acid with a basic excipient, or

(b) an amphoteric antidiabetic benzoic acid with a basic or acid excipient, or

(c) a basic antidiabetic benzoic acid with an acid excipient in an inert polar solvent in the presence of at least one solubilizing or emulsifying substance, where the molar ratio of benzoic acid to basic or acid excipient is less than 1:1 and the ratio of benzoic acid to the total of solubilizing or emulsifying substance is from about 1:0.5 to 1:10 parts by weight, applying the resulting solution or emulsion to the surface of at least one water-insoluble carrier, where the ratio of benzoic acid to the total of water-insoluble carrier is from 1:1 to 1:12 parts by weight, and drying the thus treated water-insoluble carrier.

4,873,081

PERCUTANEOUS ABSORPTION PREPARATION

Taro Ogiso, Higashiosaka, Japan, assignor to Maraho Co., Ltd., Osaka, Japan

Filed Mar. 26, 1987, Ser. No. 31,241
Claims priority, application Japan, May 7, 1986, 61-105350
Int. Cl.[4] A61K *31/40, 31/54, 31/78*
U.S. Cl. 424—81 **10 Claims**

1. A percutaneous absorption preparation which comprises:

(a) an active ingredient comprising a calcium salt of indomethacin or tolmetin in an amount of 0.3–10% by weight of the preparation:

(b) a medium for the active ingredient selected from the group consisting of an ethylene glycol mono-lower alkyl ether, propylene glycol, polyethylene glycol and dimethylsulfoxide, in an amount at least sufficient to dissolve the active ingredient; and

(c) an absorption promoter selected from the group consisting of 1-dodecylazacycloheptan-2-one hexamethylenelauramide, N-methyl-2-pyrrolidone, a sucrose aliphatic acid ester, dimethylsulfoxide and a nonionic surfactant, in an amount of 0.5–10% by weight of the preparation.

4,873,082

MULTI-LAYER BIRD REPELLANT COATING COMPOSITION

Paul Cacioli, Reservoir, and Roger Snow, Sandringham, both of Australia, assignors to International Contamination Control Industries Pty Ltd., Victoria, Australia

Continuation-in-part of Ser. No. 885,812, Jul. 15, 1986, which is a continuation of Ser. No. 620,944, Jun. 14, 1984, abandoned. This application Jan. 28, 1987, Ser. No. 7,723
Claims priority, application Australia, Jan. 29, 1986, PH4368
Int. Cl.[4] A01N *27/00, 25/04*
U.S. Cl. 424—83 **9 Claims**

1. A multi-layer bird repellant coating composition for a substrate comprising:

(i) at least one bird repellant bead or strip formed from a bird repellant gel composition including:

(a) about 75 to 98% by weight based on the total weight of the gel composition of a high molecular weight polybutene having a molecular weight of 1300 to 1500 and a low molecular weight polybutene having a molecular weight of 900 to 1000;

(b) about 1 to 7% by weight based on the total weight of the gel composition of a clay-based thickening agent; and

(c) about 1 to 3% by weight based on the total weight of the gel composition of a polar organic solvent swelling agent;

said bird repellant bead or strip having sufficient tackiness to repel birds but not to substantially retard the birds and having sufficient viscosity to minimize the flattening of said bead or strip; and

(ii) a protective coating layer on said bird repellant bead or strip, said protective coating layer formed by application to the bead or strip of a coating composition comprising:

(a) an effective amount of a polymeric component, which polymeric component includes at least one vinyl aromatic polymer or vinyl aromatic copolymer,

(b) an effective amount of a solvent or emulsifier for the polymeric component;

the protective coating layer being sufficient brittle that the surface thereof is broken, in use, on contact with a bird.

4,873,083

FIBRINOLYTIC COMPOSITION

Robert L. Hunter, Tucker, and Alexander Duncan, Dunwoody, both of Ga., assignors to Emory University, Atlanta, Ga.

Division of Ser. No. 45,459, May 7, 1987, which is a continuation of Ser. No. 863,582, May 15, 1986. This application Dec. 21, 1987, Ser. No. 136,034

Int. Cl.[4] A61K *31/745, 49/00*

U.S. Cl. 424—83 **5 Claims**

1. A method of improving blood flow and oxygenation of a tumor in a human or animal, comprising the step of injecting into the human or animal a solution comprising an effective amount of a surface-active copolymer of the following formula:

$$HO(C_2H_4O)_b(C_3H_6O)_a(C_2H_4O)_bH$$

wherein a is an integer such that the hydrophobe represented by (Chd $3H_6O$) has a molecular weight of approximately 950 to 4000, and b is an integer such that the hydrophile portion represented by (C_2H_4O) constitutes from approximately 50% to 90% by weight of the compound.

4,873,084

INSECTICIDAL COMPOSITION

Stephen I. Sallay, 2918 Glencairn Dr., Ft. Wayne, Ind. 46815

Continuation of Ser. No. 719,252, Apr. 2, 1985, abandoned, which is a continuation-in-part of Ser. No. 603,340, Apr. 24, 1984, Pat. No. 4,514,326, which is a continuation-in-part of Ser. No. 489,176, Apr. 27, 1983, abandoned, which is a continuation-in-part of Ser. No. 429,133, Sep. 30, 1982, Pat. No. 4,504,546, which is a continuation-in-part of Ser. No. 286,042, Jun. 22, 1981, Pat. No. 4,382,025, which is a continuation-in-part of Ser. No. 135,177, Mar. 28, 1980, abandoned, which is a continuation-in-part of Ser. No. 927,340, Jul. 24, 1978, Pat. No. 4,196,177. This application Dec. 18, 1987, Ser. No. 134,704

Int. Cl.[4] A01N *59/14*

U.S. Cl. 424—658 **8 Claims**

1. An insecticidal composition comprising an aqueous solution containing a insecticidally effective amount of from 0.01–5.0% of ammonium pentaborate and from 0.01–2.0% of a mildewcide.

4,873,085

SPUN-FIBROUS COSMETIC AND METHOD OF USE

Richard C. Fuisz, Bethlehem, Pa., assignor to Fuisz Pharmaceutical Ltd., Washington, D.C.

Continuation-in-part of Ser. No. 40,371, Apr. 20, 1987, abandoned. This application Mar. 18, 1988, Ser. No. 169,914

The portion of the term of this patent subsequent to Aug. 8, 2006, has been disclaimed.

Int. Cl.[4] A61K *7/44;* **A61L** *23/00;* **A23G** *3/02*

U.S. Cl. 424—400 **25 Claims**

1. A spun fibrous cosmetic composition comprising a rapidly dissoluble mass of water soluble spun fibers of a material capable of being spun into fibers that are readily water-soluble, and an effective quantity of an active agent distributed on or incorporated in said fibrous mass where said active agent has cosmetologic activity.

4,873,086

HYDROGELS WITH INCREASED ORGANIC SOLVENT SOLUBLE ACTIVE AGENT LOADING CAPACITY, THEIR PREPARATION AND THE USE THEREOF

William R. Good, Suffern, N.Y.; John Mikes, Madison, and Joseph Sikora, Wanaque, both of N.J., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 835,414, Mar. 3, 1986, abandoned. This application Aug. 8, 1988, Ser. No. 229,189

Int. Cl.[4] A61K *31/78, 31/74*

U.S. Cl. 424—409 **15 Claims**

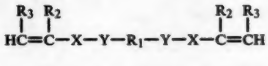
1. A process for the preparation of a controlled, sustained release composition comprising:

(a) an organic-solvent soluble active agent in an amount sufficient for the total desired dosage during the release period and distributed within

(b) a water-insoluble macromer expanded hydrogel comprising the crosslinked copolymerization product of

(A') about 30 to about 90% by weight of said hydrogel of (a') a water-soluble monoolefinic monomer, or mixture of said monomers, of (b') a water-soluble monoolefinic monomer, or mixture of said monomers with 1 to 50% by weight of total monomers of a water-insoluble monoolefinic monomer, or mixture of said water-insoluble monomers, with

(B) about 70 to about 10% by weight of said hydrogel of a terminal diolefinic hydrophobic macromer having a molecular weight from about 400 to about 8000, said macromer having the formula



(I)

wherein R_1 is a polycondensate chain having a molecular weight from about 200 and about 8000, which is the residue of a poly (propylene oxide) or poly(tetramethylene oxide) glycol having ether linkages; R_2 is hydrogen, methyl or $—CH_2COOR_4$ wherein R_4 is hydrogen or an alkyl group with up to 10 carbon atoms; R_3 is hydrogen or $—COOR_4$, with the proviso that at least one of R_2 and R_3 is hydrogen; X is oxa, —COO—, or $—CONR_5$ —wherein R_5 is hydrogen or alkyl of up to 5 carbon atoms and Y is a direct bond or the radical $—R_6—Z_1—CO—NH—R_7—NH—CO—Z_2—$, wherein R_6 is linked to X and represents branched or linear alkylene of up to 7 carbon atoms; Z_1 and Z_2 are oxa or NR_5 and R_7 is the diradical of an aliphatic or aromatic diisocyanate, with the proviso that in case Xi is oxa, Y is different from a direct bond, and R_2 and R_3 are hydrogen; comprising the steps of copolymerizing said monomer (A) and said macromer (B) in the presence of a free radical initiator at the reaction temperature between about 20° to about 150° C., in the presence or absence of a substantially inert diluent, and in the presence of an effective macromer (B) expanding amount of a macromer (B) soluble compound of the formula

'—R''—O—$_n$R''' (II)

wherein R' is HO—, alkoxy of up to eight carbon atoms or alkanoyloxy of up to eight carbon atoms; R'' is straight or branched chain alkylene of two to six carbon atoms; R''' is hydrogen, alkyl of up to eighteen carbon atoms or alkanoyl of up to eighteen carbon atoms; and n is an integer from 1 to about 100, with the proviso that if n is 1 or R'' is ethylene, R''' is alkyl of two to eighteen carbon atoms or alkanoyl of three to eighteen carbon atoms, or a mixture thereof; to form said hydrogel; and loading said active agent (a) into said hydrogel.

4,873,087

SUPPOSITORY PREPARATION HAVING EXCELLENT ABSORPTION PROPERTY

Masataka Morishita; Renji Aikawa; Shigeo Katsuragi; Yoshiaki Yamamoto, and Kenichi Sugimoto, all of Shizuoka, Japan, assignors to Toyo Jozo Company, Ltd., Shizuoka, Japan

Filed Mar. 8, 1982, Ser. No. 355,887

Claims priority, application Japan, Jan. 14, 1982, 57-4222

The portion of the term of this patent subsequent to Sep. 10, 2002, has been disclaimed.

Int. Cl.[4] A61K *9/02*

U.S. Cl. 424—433 **9 Claims**

1. A suppository having excellent absorption property, comprising (1) a water-soluble medicine, (2) a water-soluble substance selected from the group consisting of water-soluble salts and water-soluble saccharides at a concentration exhibiting 1.5–6.0 fold of osmotic pressure of isotonic sodium chloride solution, and (3) at least 0.01 W/W % of an absorption promoter which is at least one N-acyl amino acid derivative or N-acyl peptide derivative represented by the formula:

R—CO—A,

wherein R is an aliphatic hydrocarbon group, a substituted aliphatic hydrocarbon group, an aromatic hydrocarbon group, a substituted aromatic hydrocarbon group, an aryl-substituted lower hydrocarbon group or a substituted aryl-substituted lower hydrocarbon group; wherein said substituted aliphatic hydrocarbon group, said substituted aromatic hydrocarbon group or said substituted aryl-substituted lower hydrocarbon group is substituted with a member selected from the group consisting of a lower alkyl group, a hydroxyl group, a carboxylic acid group, an alkoxy group, a phosphoric acid group, an amino group, an imino group and a halogen; and A is an amino acid residue or a peptide residue.

4,873,088

LIPOSOME DRUG DELIVERY METHOD AND COMPOSITION

Eric Mayhew, South Wales; M. Jane Ehrke, Lancaster; Kenneth Mace, Buffalo, all of N.Y.; Francis Szoka, San Francisco, Calif., and Fred C. Olson, Helena, Mont., assignors to Liposome Technology, Inc., Menlo Park, Calif.

Continuation-in-part of Ser. No. 529,890, Sep. 6, 1983, abandoned, and Ser. No. 915,863, Oct. 6, 1986, abandoned. This application Jul. 13, 1987, Ser. No. 72,828

Int. Cl.[4] A61K *9/52, 49/00;* **B01J** *13/02*

U.S. Cl. 424—450 **17 Claims**

1. In the treatment of cancerous tumors in a mammal in need of such treatment, a method for enhancing the therapeutic effectiveness of adriamycin and a secondary compound capable of:

(a) reducing adriamycin toxicity; or

(b) enhancing the induction of host defenses by adriamycin, when administered in free form, comprising

providing a suspension of lipid bilayer vesicles containing co-entrapped adriamycin and the secondary compound, and

administering a therapeutically effective amount of the suspension parenterally.

4,873,089

PROTEOLIPOSOMES AS DRUG CARRIERS

Anthony W. Scotto, Middle Village, and David Zakim, Armonk, both of N.Y., assignors to Cornell Research Foundation Inc., Cornell University, Ithaca, N.Y.

Continuation of Ser. No. 754,319, Jul. 12, 1985, abandoned. This application Mar. 21, 1988, Ser. No. 171,197

Int. Cl.[4] A61K *37/22*

U.S. Cl. 424—450 **10 Claims**

1. A process for the preparation of fusogenic proteoliposomes comprising:

(a) mixing a fusogen with a lipid component used to form unilamellar lipid vesicles to thereby form fusogenic unilamellar lipid vesicles;

(b) mixing said fusogenic unilamellar lipid vesicles with integral membrane proteins; and

(c) lowering the temperature of the mixture of fusogenic unilamellar lipid vesicles and integral membrane proteins to at or below the phase transition temperature of the fusogenic unilamellar lipid vesicles to thereby form fusogenic proteoliposomes.

4,873,090

NON-ADJUVENATED VACCINE

Robert L. Clancy, Newcastle, Australia, assignor to Broncostat Pty. Limited, Perth, Australia

PCT No. PCT/AU86/00071, § 371 Date Nov. 12, 1986, § 102(e) Date Nov. 12, 1986, PCT Pub. No. WO86/05691, PCT Pub. Date Oct. 9, 1986

PCT Filed Mar. 17, 1986, Ser. No. 2,625

Claims priority, application Australia, Mar. 27, 1985, PG9928

Int. Cl.[4] A61K *9/48, 39/02*

U.S. Cl. 424—451 **11 Claims**

1. An enteral non-adjuvenated monobacterial vaccine comprising a killed bacteria for immunization against bacterial infection of mucosal sites;

the killed bacteria being selected from the group consisting of Haemophilus influenzae, Streptoccoccus pneumoniae, Pseudomonas aeruginosa, and Staphyloccoccus aureus;

the vaccine comprising a pharmaceutically acceptable carrier which does not elicit an antigenic response and being in the form of an enteric coated tablet, granule, capsule or dragee for oral administration;

the monobacterial vaccine comprising a single bacteria and being in the absence of any adjuvant therefor, so as to stimulate only a limited immune response in a patient.

4,873,091

CONTROLLED RELEASE FORMULATING EMPLOYING RESILIENT MICROBEADS

Laura J. Jankower, and Larry W. Shipley, both of Lafayette, La., assignors to Advanced Polymer Systems, Inc., Redwood City, Calif.

Filed May 23, 1988, Ser. No. 197,375

Int. Cl.[4] A61K *9/14;* **C08J** *9/28*

U.S. Cl. 424—489 **94 Claims**

1. A method for forming solid resilient particles containing a substantially continuous network of pores open to the exterior of said particles, said method comprising:

(a) combining an ethylene-propylene-diene elastomeric prepolymer with a substantially water-immiscible liquid species which is inert with respect to said prepolymer to form a homogeneous, substantially water-immiscible liquid solution;

(b) dispersing said liquid solution in an aqueous solution to form a suspension;

(c) polymerizing said prepolymer in said suspension to form solid resilient particles containing said water-immiscible liquid species;

(d) recovering said solid resilient particles from said suspension; and

(e) extracting said water-immiscible liquid species from said solid resilient particles.

4,873,092

SLOW-RELEASING PREPARATION

Ichiro Azuma; Seiichi Tokura, both of Sapporo; Shinichiro Nishimura, Sapporo, and Hiroshi Seo, Senka, all of Japan, assignors to Mururta Kikai Kabushiki Kaisha, Kyoto, Japan

Filed May 21, 1987, Ser. No. 53,072
Int. Cl.[4] A61K *9/50*
U.S. Cl. 424—499 11 Claims

1. A slow-releasing preparation consisting essentially of porous granules of deacetylated chitin as a carrier and at least one physiologically active therapeutic substance contained in the granules, wherein said therapeutic substance is selected from the group consisting of an anticancer drug, a hormone drug, an antiepileptic drug, an antiemetic, a psychotropic drug, an antispastic, a cardiotonic, an antiarrhythmic agent, an angiotonic, a vasodilator, and a sulfur drug.

4,873,093

STARCH SNACK FOODS AND PROCESS

Richard D. Fazzolare, Pearl River, N.Y.; Joseph A. Szwerc, Mahwah, and Rich McFeaters, Hackensack, both of N.J., assignors to Nabisco Brands, Inc., Parsippany, N.J.

Continuation-in-part of Ser. No. 681,647, Dec. 14, 1984, abandoned. This application Sep. 5, 1985, Ser. No. 772,918
Int. Cl.[4] A21D *8/06;* A23P *1/08*
U.S. Cl. 426—28 10 Claims

1. A method for making a baked-starch based chip-like snack food comprising:

(a) mixing at least one ingredient having starch with water to form a non-elastic, starch-based composition, said at least one ingredient having starch comprising a member selected from the group consisting of potato, corn, buckwheat, rice, barley, tapioca, wheat, rye sorghum, and graham ingredients;

(b) steaming said starch-based composition with continued mixing until a composition temperature of at least 160° F. is obtained for a sufficient amount of time for said composition to form a machinable dough-like consistency;

(c) machining said dough-like composition whereby pieces are formed, said machining including:

(i) laminating a sheet of said dough-like composition to obtain over lapping laminae of said sheet;

(ii) rolling said dough-like the laminated composition in at least one reduction roller; and

(iii) cutting said dough-like the rolled composition; and

(d) baking said pieces to obtain a snack having a flat chip-like appearance or a partially delaminated, blistered chip-like appearance.

4,873,094

METHOD OF MAKING AN ACIDIFIED DAIRY CREAM

LaMonte D. Piechke, and Ralph J. Greene, both of Eau Claire, Wis., assignors to Land O'Lakes, Inc., Arden Hills, Minn.

Continuation of Ser. No. 223,708, Jul. 21, 1988, abandoned, which is a continuation of Ser. No. 939,731, Dec. 9, 1986, abandoned. This application Mar. 29, 1989, Ser. No. 330,978
Int. Cl.[4] A23C *9/12;* A23L *3/00*
U.S. Cl. 426—43 20 Claims

1. A method for processing an acidified dairy-derived cream, the method comprising:

providing an acidified dairy-derived cream having a pH level below approximately 4.6;

heating the cream to a temperature range of approximately 222° F. to 264° F. while simutaneously subjecting the cream to a pressure of at least approximately 180 psig for a time period sufficient to extend ambient temperature shelf life to at least four weeks; and

aseptically packaging the cream.

4,873,095

EXTRACTION OF SOLUBLE MATERIALS FROM WHOLE CITRUS FRUIT

Kevin W. Rundle, Box 206, Berri, South Australia, Australia

Continuation-in-part of Ser. No. 784,298, Oct. 7, 1985, abandoned. This application Nov. 4, 1987, Ser. No. 116,319
Claims priority, application Australia, Oct. 5, 1984, PG7515
Int. Cl.[4] A23L *2/06*
U.S. Cl. 426—50 8 Claims

1. A process for the extraction of soluble materials from whole citrus fruit selected from the group consisting of oranges, mandarins and grapefruit having the skin thereon, said process comprising the steps of:

severing the whole fruit to form fruit slices having the skin thereon;

extracting juice having an amount of bitter principles from said fruit slices with the skin thereon by extracting said fruit slices with water in a countercurrent extractor to form an extracted juice containing insoluble particulate material, said extraction being conducted such that bitter principles are retained or absorbed by said insoluble particulate material relative to said extracted juice so that the introduction of bitter principles into the extracted juice is reduced by about 50%;

subjecting said extracted juice obtained from said countercurrent extractor to a pectinase enzyme in an amount and for a time sufficient to reduce the viscosity of said extracted juice to enable removal of at least some insoluble particulate material from said extracted juice;

deactivating said pectinase enzyme in said extracted juice; and

removing at least some of said insoluble particulate material present in said extracted juice together with bitter principles, to obtain citrus juice of reduced bitterness.

4,873,096

SIMULATED EGG TREATS FOR PETS

Albert A. Spiel, Yonkers, N.Y.; James Roe, Wayne, and Henry C. Spanier, West Milford, both of N.J., assignors to Nabisco Brands, Inc., East Hanover, N.J.

Continuation of Ser. No. 000,431, Jan. 5, 1987, Pat. No. 4,795,655, which is a continuation-in-part of Ser. No. 578,040, Feb. 2, 1986, Pat. No. 4,634,597, and a continuation-in-part of Ser. No. 898,187, Aug. 20, 1986, Pat. No. 4,711,425. This application Aug. 23, 1988, Ser. No. 235,059
Int. Cl.[4] A23K *1/00*
U.S. Cl. 426—72 15 Claims

15. A dry hard pet egg treat biscuit having a base egg white portion and upper egg yolk portion, said base egg white portion being formed in an oblate ellipsoidal shape from a dough comprising 40 to 50 weight percent of flour, 10 to 20 weight percent of meal and from 10 to 15 weight percent of egg solids

and said egg yolk portion comprising from 15 to 25 weight percent of flour, 4 to 8 weight percent of meal, from 12 to 18 weight percent of a sugar and from 15 to 20 weight percent egg solids, wherein said base portion has a substantially planar lower surface and a substantially planar upper surface having an indentation therein, said indentation having a substantially planar lower surface therein containing a plurality of grooves into which said upper egg yolk portion is deposited so that the base egg white portion and said egg yolk portion adhere and bond together when the biscuit is baked.

4,873,097

ZEOLITES IN POULTRY NUTRITION

Sebastian M. Laurent, Greenwell Springs, and Robert N. Sanders, Baton Rouge, both of La., assignors to Ethyl Corporation, Richmond, Va.

Continuation of Ser. No. 846,188, Mar. 31, 1986, abandoned, which is a continuation of Ser. No. 741,752, Jun. 5, 1985, abandoned, which is a division of Ser. No. 475,370, Mar. 14, 1983, Pat. No. 4,556,564. This application Apr. 27, 1987, Ser. No. 42,987

Int. Cl.[4] A23K *1/00*

U.S. Cl. 426—74 **10 Claims**

1. A feed formulation for laying poultry for improving egg shell quality of eggs laid by the poultry consisting essentially of a laying poultry feed containing an amount of calcium sufficient to effect an increase in egg shell and mixed therewith about 0.25 up to about 2 percent by weight of synthetic sodium zeolite A, said feed formulation having the property of improving egg shell quality of the eggs laid by the poultry to which it is fed.

4,873,098

METHOD FOR CONTROLLING THE SPREAD OF SOFT COOKIES

Lori Banks, Lincoln Park; Grant C. Busk, Jr., Chester; Bin Chiang, Cedar Knolls, and Robert Thulin, Wyckoff, all of N.J., assignors to Nabisco Brands, Inc., East Hanover, N.J.

Filed Oct. 15, 1987, Ser. No. 108,466

Int. Cl.[4] A21D *13/08*

U.S. Cl. 426—94 **21 Claims**

1. A method for controlling spread in soft cookies having an extended shelf life comprising:

(a) forming a dough by admixing unbleached flour, a humectant for imparting softness to the cookies for at least two months when the cookie is packaged in a closed container, water, shortening or fat, and from about 2% by weight to about 20% by weight of a cold-water swelling granular starch material having a cold water solubility of at least 50%,

(b) forming the dough into pieces, and

(c) baking the dough pieces to a moisture content of at least 6% by weight and a water activity of less than about 0.7, the weight percent of said granular starch material being based upon the weight of the unbleached flour, said starch material serving to reduce cookie spread.

4,873,099

EDIBLE FOOD PRODUCT AND PACKAGE

Mark R. Ruiz, 5445 Del Amo Blvd., Ste. 204, Lakewood, Calif. 90714

Filed Dec. 9, 1987, Ser. No. 131,919

Int. Cl.[4] A21D *13/00*

U.S. Cl. 426—104 **1 Claim**

1. A consumable food product comprising:

an edible shell consisting of a circular base integrally supporting an upwardly and outwardly projecting continuous sidewall and being totally composed of a digestible material;

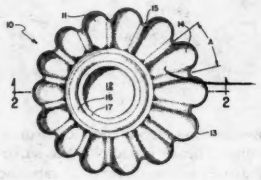
said base provided with at least one annular reinforcement bead coaxially disposed with respect to said circular sidewall;

said circular sidewall having a plurality of semicircular convolutions of equal diameter integrally provided about said circular base, each of said semicircular convolutions having a central axis radiating upwardly and outwardly from said circular base;

said semicircular convolutions and said base annular bead cooperating to provide combined reinforcement applied load carrying characteristics;

said convolutions of equal diameter are provided in a series in adjacent side-by-side relationship;

said continuous sidewall angles outwardly to diverge form said circular base and having a roughened exterior surface contributing to said load carrying characteristics wherein said continuous sidewall and base resists breakage, damage and separation;



said diverging circular sidewall permits a plurality of said shells to be nested together in a stack whereby equal load paths are established conducting applied loads from shell-to-shell throughout said stack;

form means supporting said shells in said nested stack;

said form means comprising a pair of conical forms separated by said stack of shells with a portion of each form extending beyond the endmost shells of said stack and the diameter of the widest end of each form being a greater diameter than the diameter of said shells; and

a film surrounding said nested shells in said stack engaged with said extended portions of each form in spaced relationship to said stack for holding said shells in a unitary construction.

4,873,100

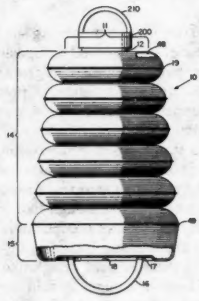
BISTABLE EXPANDABLE BOTTLE

Robert S. Dirksing, Cincinnati; Richard M. Girardot, Wyoming, and Theodore P. Merz, Cincinnati, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Apr. 15, 1987, Ser. No. 38,794

Int. Cl.[4] B65D *1/40, 1/44*

U.S. Cl. 426—111 **46 Claims**



1. A bistable bottle for storage of a concentrated material to be diluted within said bottle and dispensed in diluted form directly therefrom, said bottle being capable of maintaining either a collapsed condition or an expanded condition until is is

acted upon by an external force applied in a direction substantially parallel to the vertical axis of said bottle, said bottle exhibiting improved resistance to both expansion and collapse when said bottle is in its expanded condition, said bottle comprising:

(a) a lowermost portion;

(b) an uppermost portion, said uppermost portion including an orifice for introducting concentrated material and diluent into said bottle and for dispensing diluted material from said bottle; and

(c) a resilient, continuous sidewall portion having its lowermost end sealingly secured to said lowermost portion of said bottle and its uppermost end sealingly secured to said uppermost portion of said bottle, said continuous sidewall portion comprising a multiplicity of bellows, each of said bellows being sealingly interconnected to the adjacent bellows by means of a hinge ring which defines a minor diameter of said bottle sidewall portion, each of said bellows comprising a pair of curvilinear legs joined to one another an an outermost hinge point substantially coinciding with the major diameter of said bellows, said curvilinear legs comprising said bellows gradually tapering from a maximum thickness at their points of joinder to their respective hinge rings to a minimum thickness at said outermost hinge point, each of said hinge rings interconnecting adjacent bellows comprising a discrete wall segment of sufficient height to permit collapse of said bottle without causing interference between the curvilinear legs to which the ends of said hinge ring are sealingly secured, said points of securement between said hinge ring and said curvilinear legs being thinner than the adjacent portion of said hinge ring and the curvilinear leg to which it is sealingly secured, thereby defining a pair of innermost hinge points substantially coinciding with the minor diameter of said bottle sidewall for each of said hinge rings, each of said curvilinear legs exhibiting its maximum horizontal orientation immediately adjacent said hinge rings and its maximum vertical orientation immediately adjacent said outermost hinge points, one of said curvilinear legs being outwardly convex relative to the interior of said bottle in both the collapsed and expanded condition of said bottle and the other of said curvilinear legs being outwardly convex relative to the interior of said bottle in the expanded condition of said bottle, but inwardly convex relative to the interior of said bottle in the collapsed condition of said bottle, said bottle exhibiting improved resistance to both expansion and collapse while in its expanded condition due to the maximum vertical alignment of each pair of said curvilinear legs immediately adjacent the outermost hinge point joining said pair of curvilinear legs to one another.

4,873,101

MICROWAVE FOOD PACKAGE AND GREASE ABSORBENT PAD THEREFOR

Curtis L. Larson, City of Hudson, Wis., and Pierre H. LePere, City of Cottage Grove, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 780,219, Sep. 26, 1985, abandoned. This application Aug. 10, 1987, Ser. No. 82,421

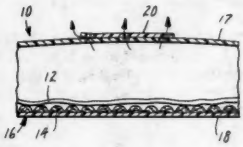
Int. Cl.[4] B65D *81/34*

U.S. Cl. 426—113 **9 Claims**

1. A package for use in a microwave oven, said package comprising:

(a) food to be cooked by microwave energy containing a substantial amount of water and solidified grease;

(b) a pad adjacent said food comprising generally microwave radiation transparent and generally hydrophobic grease absorbing microfibers constructed of a composition comprising a blend containing substantially equal parts by weight of polypropylene and poly 4-methylpentene-1, said pad capable of holding the amount of grease in said food when it is melted by cooking said food; and



(c) a vapor tight microwave radiation transparent enclosure surrounding said pad and said food.

4,873,102

MAGNETIC PARTICLES

Manchium Chang, 4589 Via Marisol, #265, Los Angeles, Calif. 90042, and Michael S. Colvin, 25001 Pacific Coast Hwy., Malibu, Calif. 90265

Filed Mar. 14, 1988, Ser. No. 167,723

Int. Cl.[4] B05D *5/12*

U.S. Cl. 427—130 **13 Claims**

1. A method of forming a magnetic polymeric material containing particles of magnetic metal oxide distributed throughout the material comprising the steps of:

immersing a swellable, porous polymer in an aqueous solution of a metal salt which is a precursor of said particles of magnetic metal oxide, said metal salt being a salt of a strong acid and a metal ion selected from iron, cobalt or nickel;

swelling the polymer in said solution while diffusing said metal containing salt solution into said pores;

adding a strong base selected from a hydroxide of a Group I metal ion or ammonium to the solution;

reacting the base with the metal salt within the pores to form finely-divided magnetic metal oxide particles within the pores of the polymeric material.

4,873,103

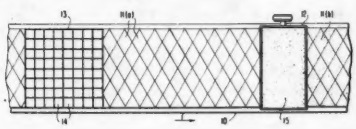
FLOWABLE MATERIAL DISTRIBUTION SAMPLING METHOD

Robert J. Cordera, East Amherst, N.J., assignor to Nabisco Brands, Inc., East Hanover, N.J.

Filed Mar. 3, 1988, Ser. No. 163,539

Int. Cl.[4] G01N *1/20*

U.S. Cl. 426—233 **16 Claims**



1. A method for determining the distribution of a flowable coating material onto food articles in the process of being bakes, and which are disposed on a moving lower surface beneath a dispenser comprising dispensing said flowable material downwardly onto said food articles on said lower surface a multi-sectioned device to collect a representative sample of said flowable material and determining the amount of said flowable material in each section of said multi-sectioned device.

4,873,104

METHOD OF PRODUCING VARIEGATED EXTRUDED PRODUCTS

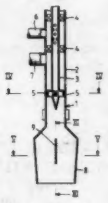
Ian Butcher, Guildford, and Kevin P. Hillman, Cheltenham, both of Great Britain, assignors to Thomas J. Lipton, Inc., Englewood Cliffs, N.J.

Filed Apr. 20, 1988, Ser. No. 183,850

Claims priority, application United Kingdom, Apr. 22, 1987, 8709478; Apr. 22, 1987, 8709479; Apr. 22, 1987, 8709480

Int. Cl.[4] A23L *1/27*

U.S. Cl. 426—249 2 Claims



1. A method of producing a variegated extruded product comprising feeding a first viscous product through a tube, rotationally introducing a second, different viscous product into said first viscous product, while preventing homogeneous mixing, to form a stream of the two distinct products and conducting this stream along at least one divider in the tube, which divider has one of its main dimensions substantially in the direction of flow of the stream prior to extrusion to form the product.

4,873,105

METHOD FOR THE TREATMENT OF AN ELONGATED ARGICULTURAL PRODUCE

Joseph Coppolani, Meudon La Foret, France, assignor to Femia Industrie, Paris, France

Filed Jun. 23, 1988, Ser. No. 210,319

Claims priority, application France, Jun. 25, 1987, 87 8967

Int. Cl.[4] A23P *1/00;* B23D *19/00*

U.S. Cl. 426—481 6 Claims

1. A method for sorting or cutting off the ends of elongated agricultural produce, occurring near a surface of an inner lateral wall of a rotary drum that has a longitudinal axis, wherein said produce is continually brought to a top of the drum due to the rotation thereof, and then falls towards a bottom of the drum, comprising the steps of

stopping the fall of the produce, after a relatively short initial falling distance, at a point intermediate of the top and the bottom of the drum, thus lowering the effective falling distance of the produce to reduce an impact speed thereof;

receiving the produce and transporting it along an approximately helicoidal path in order not only to move the produce toward the bottom of the drum to a lower level located at a relatively low height above the bottom of the drum but also to move it in a direction parallel to the longitudinal axis of the drum; and

making the produce fall once more down to the bottom of the drum from said lower level.

4,873,106

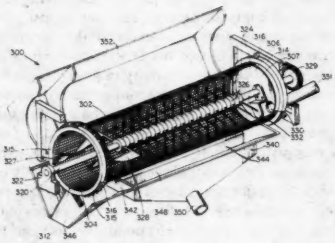
METHOD OF AND APPARATUS FOR SEPARATING JUICE SACS FROM THE SECTIONAL MEMBRANES OF A FRUIT MEAT SECTION

Michael S. Kolodesh, Cincinnati; Douglas Toms, St. Bernard, and Bruce A. Pierson, Cincinnati, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jun. 3, 1988, Ser. No. 202,173

Int. Cl.[4] A23L *1/212;* A23N *1/00*

U.S. Cl. 426—481 13 Claims



9. A method of separating juice and juice sacs from the sectional membranes of a fruit meat section extracted from a fruit, said method comprising the steps of:

(a) feeding said extracted fruit meat sections into the interior of a tubular screen, said screen having a rotatable shaft coaxial therewith, said shaft having a plurality of striker bars projecting therefrom;

(b) tumbling said extracted fruit meat sections by rotating said tubular screen;

(c) striking said extracted fruit meat sections with said plurality of striker bars, whereby said juice and juice sacs are separated from said sectional membranes; and

(d) collecting said separated juice and juice sacs.

4,873,107

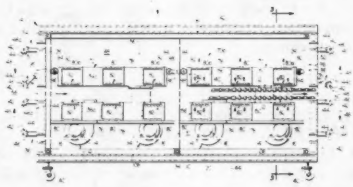
AIR IMPINGEMENT TUNNEL OVEN APPARATUS

Virgil L. Archer, Dallas, Tex., assignor to Archer Air Industries, Inc., Dallas, Tex.

Filed Dec. 24, 1986, Ser. No. 946,521

Int. Cl.[4] A23L *1/01;* A23B *4/04;* F26B *3/00*

U.S. Cl. 426—520 47 Claims



36. A method of thermally treating a food item with a gas impingement apparatus comprising:

an elongated housing having a heat treatment passage extending longitudinally therethrough along an axis;

first and second plenum ducts each having a wall portion defined by alternating series of parallel ridges which respectively project toward and away from the interior of the plenum duct with which the wall portion is associated, each of said wall portions having a plurality of rectangular slots in the outer portions of the ridges which project away from the interior of their associated plenum duct;

said first and second plenum ducts being positioned within

said heat treatment passage on opposite sides of said axis with said wall portions being laterally spaced apart from and facing said axis;

one of said first and second plenum ducts being supported for selective movement toward or away from said axis, said method comprising the steps of:

flowing a heated gas, at a predetermined temperature suitable for thermally treating the food item, into said first and second plenum ducts and outwardly through said slots in said wall portions thereof toward said axis; and

conveying the food item through said passage, generally parallel to said axis and between said first and second plenum ducts, to thermally treat the food item by impingement thereon of heated gas being discharged through said slots in said wall portions of said first and second plenum ducts.

4,873,108

PROCESS FOR PREPARING HYDROGEN CHLORIDE HYDROLYZED PROTEIN

Johannes F. M. De Rooij, Sellindge, Great Britain, and Stephen E. Meakins, Canterbury, United Kingdom, assignors to Unilever Patent Holdings B.V., Rotterdam, Netherlands

Filed May 2, 1986, Ser. No. 858,751

Claims priority, application European Pat. Off., May 6, 1985, 85200704

Int. Cl.[4] A23L *1/228*

U.S. Cl. 426—533 **3 Claims**

1. A process for preparing hydrogen chloride hydrolysed protein, consisting essentially of dissolving the hydrolysate in water and subjecting this solution to gel filtration over a porous material

which is a crosslinked dextran and which has an average pore diameter between 0.5 and 2.5 nanometers, and eluting a fraction

characterized by:

(a) a content of NaCl between 0 and 35% w/w;

(b) a content of free amino acids between 25 and 100% w/w; and

(c) a content of glutamic acid between 8 and 60% w/w calculated as dry matter; and

(d) that the amount of apolar amino acids relative to total amino acids is reduced by at least 50% of the original value.

4,873,109

CACAO BUTTERN SUBSTITUTE COMPOSITION

Yukitaka Tanaka; Hisao Omura; Yuuichi Irinatsu; Takashi Kobayashi, and Aiko Noguchi, all of Ibaraki, Japan, assignors to Kao Corporation, Tokyo, Japan

Continuation of Ser. No. 840,292, Mar. 14, 1986, abandoned. This application Apr. 28, 1988, Ser. No. 188,196

Claims priority, application Japan, Mar. 25, 1985, 60-60267

Int. Cl.[4] A23D *5/00;* **A23G** *1/00*

U.S. Cl. 426—607 **9 Claims**

1. A cacao butter substitute composition which consists essentially of:

(a) at least 80 percent by weight, based on the total weight of the composition, of 1,3-disaturated-2-oleoyl glycerols having a member selected from the group consisting of palmitoyl groups, stearoyl groups and palmitoyl and stearoyl groups contained at the 1 and 3 positions of said glycerols, said 1,3-disaturated-2-oleoyl glycerols consisting of:

(a-1) up to 10 percent by weight of 1,3-dipalmitoyl-2oleoyl glycerol, based on the total weight of (a),

(a-2) 25 to 45 percent by weigh of 1-palmitoyl-2-oleoyl-3-stearoyl glycerol, based on the total weight of (a), and

(a-3) 45 to 70 percent by weight of 1,3-distearoyl-2-oleoyl glycerol, based on the weight of (a), and

(b) up to 20 percent by weight, based on the total weight of the composition, of glycerides comprising:

(b-1) up to 10 percent by weight of triglycerides having two unsaturations in the molecule,

(b-2) up to 6 percent by weight of diglycerides,

(b-3) up to 5 percent by weight of 1,2-disaturated-3-oleoyl glycerols,

(b-4) up to 5 percent by weight of trisaturated glycerides and

(b-5) up to 5 percent by weight of triglycerides having three or more unsaturations in the molecule.

4,873,110

METHOD FOR PRODUCING BREAKFAST CEREAL

Allen T. Short, Barrington, and Raleigh J. Wilkinson, Lockport, both of Ill., assignors to J. R. Short Milling Company, Chicago, Ill.

Continuation-in-part of Ser. No. 177,831, Mar. 22, 1988, which is a continuation of Ser. No. 37,054, Apr. 13, 1987, abandoned, which is a continuation of Ser. No. 836,704, Mar. 6, 1986, abandoned. This application May 20, 1988, Ser. No. 196,589

Claims priority, application Canada, Mar. 30, 1987, 533273

Int. Cl.[4] A23L *1/164*

U.S. Cl. 426—621 **10 Claims**

1. A method for producing a breakfast cereal comprising the steps of

extruding a gelatinized starch-containing material to form pellets;

drying said extruded pellets to a moisture content of from about 9.5 to about 14.0 percent by weight under conditions which inhibit case hardening to form dried half products suitable for extended storage;

rehydrating said dried pellets to a moisture content of from about 18.0 to about 23.0 percent by weight to form rehydrated half products;

flaking said rehydrated pellets into flakes; and

toasting said flakes to a final moisture content of from about 2.0 to about 5.0 percent by weight.

4,873,111

FUR ANIMAL FEED AND A METHOD FOR PREPARING THE SAME

Pirkko K. Aaltonen, and Ilkka T. Siissalo, both of, Helsinki, Finland, assignors to Cultor Oy, Helsinki, Finland

Filed Jan. 22, 1988, Ser. No. 146,832

Claims priority, application Finland, Jan. 23, 1987, 870287

Int. Cl.[4] A23K *1/10*

U.S. Cl. 426—623 **4 Claims**

1. A method for thickening and toughening fur animal feed, particularly mink feed, comprising the steps of (i) obtaining a raw material selected from the group consisting of fresh fish, conserved fish, fresh offal, conserved offal, fish meal, grain and soy flour; and (ii) adding hydrothermally treated sugar beet slices to the raw material in an amount of about 1–6 % by weight of the total weight of the feed, for binding the free water present in the feed and for providing added nutritional value.

4,873,112

FRUIT CONCENTRATE SWEETNER AND PROCESS OF MANUFACTURE

Cheryl R. Mitchell, and Pat R. Mitchell, both of Manteca, Calif., assignors to FruitSource Associates, Santa Cruz, Calif.

Filed Jul. 26, 1988, Ser. No. 224,298

Int. Cl.[4] A23L *1/222, 2/00*

U.S. Cl. 426—599 **59 Claims**

1. A fruit concentrate sweetener composition comprising a blend of a hydrolyzed starch having a dextrose equivalent (D.E.) of up to 25 and a fruit juice or fruit syrup concentrate of at least about 40% soluble solids and about 0% insoluble solids thereby forming a liquor having a dry weight composition of about 40 to 65% complex carbohydrates, about 35 to 55% simple sugars from the fruit juice or fruit syrup concentrate

and about 0 to 5% nutritional components occurring naturally in the fruit juice or fruit syrup concentrate.

4,873,113

PROCESS FOR THE PRODUCTION OF EXTENDABLE THERMOGRAPHIC PLATES

Alcide Grein-Wiegand, Wanfriedwerra, Fed. Rep. of Germany, assignor to Varnel Chemical Business S.A., Switzerland

Filed Feb. 2, 1988, Ser. No. 151,564

Claims priority, application Switzerland, Feb. 16, 1987, 00564/87

Int. Cl.[4] B05D *5/00, 7/02*

U.S. Cl. 427—2 5 Claims

1. A process for producing an extendable thermographic plate by applying a capsular ink formulation based on microencapsulated liquid crystals by screen printing an elastomer plate of natural latex, the said formulation being made elastic by means of vehicles and additives which impart stability and elasticity including , as a binder, a solution of polyvinyl alcohol modified by the addition of an inorganic cobalt salt, which confers elasticity, and stability of the color-change temperatures of the liquid crystals.

4,873,114

COATING EXPENDABLE SUBSTRATES WHICH CONTACT MOLTEN METAL

Jeffrey A. Harris, West Bromwich, United Kingdom, assignor to Foseco International Limited, Birmingham, England

Continuation of Ser. No. 201,481, Jul. 9, 1980, abandoned. This application Jul. 12, 1984, Ser. No. 630,238

Claims priority, application United Kingdom, Jan. 21, 1980, 8000013

Int. Cl.[4] B05D *1/04*

U.S. Cl. 427—27 5 Claims

1. In a method of casting molten metal using a foundry sand mould or core substrate for the cast molten metal, the improvement which comprises:

(a) preparing a mould or core substrate from sand and binder so that the substrate has a resistivity of less than 10^9 ohm. cm. at 10 kv;

(b) selecting particles of refractory material coated with organic binder so that the coated particles have an electrical resistivity of at least 10^{10} kv;

(c) tribo-electrically charging the coated particles;

(d) grounding the substrate and coating the surface of the substrate to be contacted with molten metal with the charged particles so as to provide the surface of the substrate with a coherent layer of said particles; and

(e) thereafter casting the molten metal against said coated substrate.

4,873,115

METHOD OF SYTHESIZING CARBON FILM AND CARBON PARTICLES IN A VAPOR PHASE

Mitsuo Matsumura, and Toshihiko Yoshida, both of Saitama, Japan, assignors to Toa Nenryo Kogyo K.K., Tokyo, Japan

Continuation of Ser. No. 523,249, Aug. 15, 1983, abandoned. This application Aug. 14, 1985, Ser. No. 765,573

Claims priority, application Japan, Aug. 13, 1982, 57-141559

Int. Cl.[4] B05D *3/06*

U.S. Cl. 427—34 12 Claims

1. A method of synthesizing a carbon film consisting essentially of carbon and carbon particles consisting essentially of carbon on a heated substrate in a vapor phase which comprises using a single gas or a mixed gas capable of supplying halogen, hydrogen and carbon atoms as a starting material and carrying out the process by having the gas in a plasma state with the temperature of the substrate being from about 100° to 900° C. and with process being carried out under a pressure of from about 10 mm Torr to several tens of Torr until said carbon film and carbon particles deposit on the substrate while heated to about 100° to 900° C.

4,873,116

METHOD OF PREPARING MIXTURES OF INCOMPATIBLE HYDROCARBON POLYMERS

Fred H. Ancker, Warren, N.J., assignor to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Sep. 30, 1986, Ser. No. 913,517

Int. Cl.[4] C08L *23/00*

U.S. Cl. 428—36.9 38 Claims

20. A mixture of incompatible thermoplastic hydrocarbon polymers, substantially free of free radical initiators, comprising: (I) a first thermoplastic hydrocarbon polymer and (II) a second thermoplastic hydrocarbon polymer that is incompatible with the first hydrocarbon polymer, and (III) a compatibilizing mixture comprising:

(a) an inorganic filler; and

(b) from about 0.1 to 5.0 weight percent, based on the weight of (I), (II), and (III), of a reinforcement additive selected from the group consisting of:

(i) a mixture comprising two interfacial agents wherein:

(A) said agents are capable of copolymerization with each other;

(B) at least one agent contains at least one reactive olefinic double bond capable of mechanochemical grafting to the polymers;

(C) one agent is more highly adsorbable onto the filler surface while the other agent is more highly soluble in the filled polymers; and

(D) said agents have a synergy index, S, being greater than zero, which is defined by the formula:

$$S=50(Q_A+Q_S-0.2)(1-10R^*_f)(0.5-\Delta^2)$$

wherein:

Q_A and Q_S are the Alfrey-Price resonance parameters of the most reaotive olefinic double bonds in the adsorbable and soluble agents, respectively;

R^*_f is the relative flow ratio of the adsorbable agent measured by thin layer chromatography on a neutral silica gel using xylene as the eluant and di-n-butyl fumarate as the standard; and

Δ is the difference between the Hildebrand solubility parameter of the soluble agent and that of the major polymer component; and

(ii) a reinforcement promoter having at least two reactive olefinic double bonds, said promoter being characterized by having a promoter index, P, being greater than zero, which is defined by the formula:

$$P=n(n-1)Q(e+2)(1-2\ R^*_f)-2.5$$

wherein:

n is the number of olefinic double bonds in the promoter, and has a value of at least 2;

Q and e are the Alfrey-Price resonance and polyarity parameters, respectively, of at least one of the olefinic double bonds in the compound;

Q is greater than 0;

e is greater than 0; and

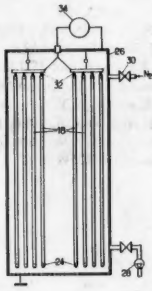
R^*_f has a value less than 0.5 and is the relative flow ratio of the promoter measured by thin layer chromatography on a neutral silica gel using xylene as the eluant and di-n-butyl fumarate as the standard.

4,873,117

STAINLESS STEEL TUBULAR ELEMENT WITH IMPROVED WEAR RESISTANCE

Dominique Hertz, Tassin, and Jean-Michel Couturier, Villeurbanne, both of France, assignors to Framatome, Courbevoie and Compagnie Generale Des Matieres Nucleaires, Villacoublay, both of, France

Filed Sep. 18, 1987, Ser. No. 97,984
Claims priority, application France, Sep. 18, 1986, 86 13078
Int. Cl.[4] B05D 3/06; G21C 7/10
U.S. Cl. 427—37 8 Claims



1. A process for manufacturing a control rod sheath for a water-cooled and moderated nuclear reactor, comprising the steps of:

providing a chromium-nickel stainless steel sleeve;

closing said sleeve with plugs;

maintaining said sleeve in a nitrogen-hydrogen atmosphere under a reduced pressure of from 30 to 200 Pascals; and

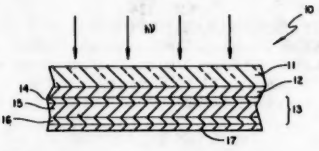
striking an electric discharge in said atmosphere for generating nitrogen ions until only a radially outer surface of said sleeve is nitrided over a depth of from 15 to 40 um.

4,873,118

OXYGEN GLOW TREATING OF ZNO ELECTRODE FOR THIN FILM SILICON SOLAR CELL

Eric Elias, Los Angeles, and Karl E. Knapp, Tarzana, both of Calif., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Nov. 18, 1988, Ser. No. 273,453
Int. Cl.[4] B05D 3/06
U.S. Cl. 427—39 13 Claims



1. In a process for production of a photoconductive device wherein a first conductive layer comprising ZnO is applied to a substrate, and a thin film silicon hydrogen alloy is applied to said first conductive layer, the improvement comprising:

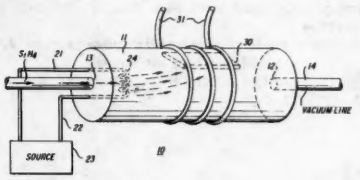
after applying said first conductive layer comprising ZnO to said substrate, treating said first conductive layer with a glow discharge in a gas containing a source of oxygen.

4,873,119

CATALYTIC DEPOSITION OF SEMICONDUCTORS

Masud Akhtar, Lawrenceville, and Herbert A. Weakliem, Pennington, both of N.J., assignors to Chronar Corp., Princeton, N.J.

Filed Jan. 28, 1987, Ser. No. 937,032
Int. Cl.[4] B05D 3/06
U.S. Cl. 427—39 5 Claims



1. A method of preparing amorphous semiconductors comprising the steps of:

(a) activating a semiconductane gas, including the hydrides of polyvalent elements, using an activator to produce mononuclear, reactive fragments and gaseous condensation products which serve as precursors for the deposition of an amorphous semicounductor; and

(b) controlling the temperature of the activator and the flow rate of the semiconductane gas so that it does not decompose upon the activator;

wherein the activator is a catalytic member, comprising an electrically heated metal wire coil, which serves to excite a semiconductane gas and bring about the production of precursors without becoming affected thereby.

4,873,120

METHOD OF MANUFACTURING CATHODE-RAY TUBE

Takeo Itou, Fukaya; Hidemi Matsuda, Oomiya; Mamoru Yoshizako, Tokyo, and Osamu Yagi, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki and Tama Chemicals Co., Ltd., Tokyo, both of, Japan

Filed Dec. 23, 1987, Ser. No. 136,943
Claims priority, application Japan, Dec. 23, 1986, 61-305206
Int. Cl.[4] B05D 5/06
U.S. Cl. 427—64 1 Claim

1. A method of manufacturing a cathode-ray tube, comprising the steps of:

(a) condensing and hydrolyzing two or more alkyl silicate monomers in an alcohol solution and in an average range of dimer to hexamer thereby forming, as a condensate a solution containing polyalkyl siloxane;

(b) coating said solution containing polyalkyl siloxane on a cathode-ray tube faceplate;

(c) continuing the condensing reaction of said solution containing polyalkyl siloxane to form a polyalkylsiloxane condensate; and

(d) sintering the polyalkyl siloxane condensate of step (c) to convert same to SiO_2 dehydration and dealcoholation reactions, thereby forming an SiO_2 film on said faceplate.

4,873,121

CATHODE/MEMBRANE ASSEMBLY AND METHOD OF MAKING SAME

Bernd D. Struck, Langerwehe; Herbert Neumeister, and Aristides Naoumidis, both of Jülich, all of Fed. Rep. of Germany, assignors to Kernforschungsaniage Julich GmbH, Jülich, Fed. Rep. of Germany

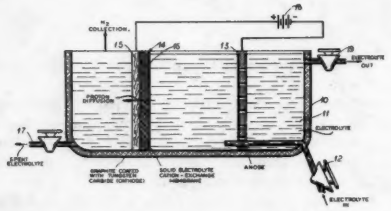
Division of Ser. No. 34,018, Apr. 1, 1987, abandoned. This application Nov. 6, 1987, Ser. No. 118,416

Claims priority, application Fed. Rep. of Germany, Apr. 9, 1986, 3611938

The portion of the term of this patent subsequent to Oct. 27, 2004, has been disclaimed.

Int. Cl.[4] B05D *5/12*; C25B *13/00*

U.S. Cl. 427—77 5 Claims



1. A method of making a cathode/membrane assembly for an electrolysis cell capable of producing hydrogen in a cathode compartment thereof, comprising:

a proton-permeable solid-electrolyte ion-exchange membrane; and

on a surface of said membrane turned toward said cathode compartment, a layer of porous graphite in the form of carbonaceous fibers coated with tungsten carbide, said method comprising the steps of:

(a) impregnating a mat of graphite fibers with a solution of para-ammoniumtungstate or tungsten hexachloride;

(b) thermally converting the para-ammonium tungstate or tungstenhexachloride to tungsten oxide on the graphite fibers;

(c) carburizing the tungsten oxide on the graphite fibers to tungsten carbide at a temperature of substantially 620° C. to 950° C. in a carburizing atmosphere, thereby forming a cathode of tungsten-carbide-coated graphite fibers to constitute said layer; and

(d) applying said cathode to a proton-permeable solid-electrolyte ion-exchange membrane by pressing said layer against said membrane to form said assembly.

4,873,122

TREATING LAMINATES WITH A WETTING/REDUCING SOLUTION AFTER DESMEARING WITH PERMANGANATE

Jeffrey Darken, Woking, England, assignor to OMI International Corporation, Warren, Mich.

Filed May 27, 1987, Ser. No. 54,715

Claims priority, application United Kingdom, Jun. 9, 1986, 8613960

Int. Cl.[4] B05D *5/12, 3/04, 3/10, 1/18*

U.S. Cl. 427—97 5 Claims

3. A method of preparing a drilled multi-layer laminate for a printed circuit board for being receptive to the deposition of copper, the method comprising the steps of:

(a) treating the laminate with permanganate to de-smear the drilled holes, thereafter with no intervening treatment,

(b) contacting the laminate with an aqueous composition of a wetting agent having a positively charged quarternary nitrogen atom and a reducing agent compatible with the wetting agent, which reducing agent is selected from:

(i) hydroxylamine and salts thereof; and

(ii) oxalic acid and salts thereof, and mixtures thereof,

(c) when there is an external copper layer on a said laminate, mildly etching said copper layer to render its adhesives qualities suitable for the deposition of electroless copper thereon,

(d) contacting the laminate with an acidic solution, and

(e) contacting the laminate with a composition for depositing catalyst for rendering the laminate's surfaces catalytic to the deposition of copper on them.

4,873,123

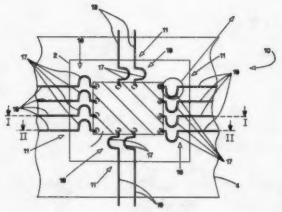
FLEXIBLE ELECTRICAL CONNECTION AND METHOD OF MAKING SAME

Michael J. Canestaro, Endicott, and William J. Summa, Endwell, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 915,485, Oct. 6, 1986, Pat. No. 4,728,751. This application Sep. 29, 1987, Ser. No. 102,447

Int. Cl.[4] B05D *5/12*

U.S. Cl. 427—96 9 Claims



1. A method for making a flexible electrical connection on a substrate made primarily of an organic material for carrying an electronic device, comprising the steps of:

placing a layer of copper on the substrate;

covering all of the copper layer on the substrate with a mask, except for area (s) of the substrate which is to have relatively high adhesion;

removing all of the copper layer not covered by the mask;

removing the mask;

treating the surface of the substrate, including the part (s) of the copper layer left on the substrate, with a cationic surfactant whereby the part (s) of the copper layer left on the substrate and treated with the cationic surfactant form a relatively low adhesive area (s); and

forming at least one circuit line on the substrate, with said circuit line having a terminus with a stress relief bend floating on the relatively low adhesive area of the substrate.

4,873,124

HEAT STABLE PREPASTES FOR WALLCOVERINGS

Arshad-Ul-Haq Chaudhry, Wellingborough, England, assignor to Scott Bader Company Limited, Wellingborough, England

Filed Jun. 14, 1988, Ser. No. 206,274

Claims priority, application United Kingdom, Jun. 16, 1987, 8714056

Int. Cl.[4] B05D *3/02, 5/10*

U.S. Cl. 427—207.1 21 Claims

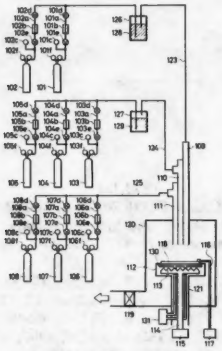
1. A method of producing a prepasted wallcovering, which method comprises applying to a substrate suitable for covering a wall a paste composition comprising a water-in-oil emulsion containing effective amount of a water-soluble polymer, and a surfactant, the water-soluble polymer being essentially wholly anionic but containing a minor amount of crosslinking residues derived from a polyfunctional monomer, and the paste composition having a pH of at least 7.

4,873,125

METHOD FOR FORMING DEPOSITED FILM

Jinsho Matsuyama, Nagahama; Yutaka Hirai, Hikone; Masao Ueki, Urayasu, and Akira Sakai, Nagahama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 26, 1987, Ser. No. 30,115
Claims priority, application Japan, Mar. 31, 1986, 61-073092
Int. Cl.[4] C23C *16/00*
U.S. Cl. 427—248.1 14 Claims



1. A method for forming a deposited film using starting materials (A) and (B), which comprises:

introducing one of the starting materials into a film forming space having a substrate therein; said substrate having a surface with crystal orientability;

allowing said one starting material to adsorb onto said surface of said substrate to thereby form an adsorption layer; and

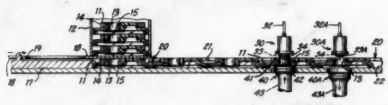
introducing the other starting material into said film forming space, to thereby cause a surface reaction on said adsorption layer to form a deposited film; said starting material (A) being a gaseous starting material for forming a deposited film; and starting material (B) being a gaseous halogenic oxidizing agent capable of having an oxidative action on said starting material (A).

4,873,126

SYSTEM AND PROCESS FOR SPOTTING REAGENTS ON POROUS SUPPORTS

Timothy G. Bloomster, Shrewsbury, Pa.; Hans H. Feindt, Parkton, Md.; Gerald D. Hahn, Lothian, Md., and S. Melissa Maret, Damascus, Md., assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.

Filed Aug. 15, 1988, Ser. No. 232,209
Int. Cl.[4] B05D *3/00;* B05C *3/18, 3/20*
U.S. Cl. 427—282 18 Claims



1. A method of coating at least one reagent onto a porous support comprising:

providing a cover having an upperside, an underside, and an aperture therethrough; the cover having secured to its underside an upper surface of the porous support so that the porous support covers the aperture on the underside of the cover;

positioning the cover in a coating station with its aperture between a dispensing assembly above the cover having a dispensing cannula and a fluid collection head below the cover;

decreasing the distance between the dispensing assembly and the fluid collection head until the fluid collection head contacts the lower surface of the porous support and the dispensing cannula is sufficiently close to the porous support that a fluid dispensed through the dispensing cannula will contact the porous support within an area defined by the aperture; and

dispensing reagent from the dispensing cannula while reducing the pressure in the fluid collection head so that fluid in the reagent is pulled through the porous support.

5. A system for coating at least one reagent on a porous support secured to an underside of a cover, the cover having guide means associated therewith and an aperture therethrough which is covered by the porous support comprising:

a slotted guide channel having upper and lower surfaces, the upper surface having a slot along its length which is dimensioned to receive the guide means of the cover and the lower surface having an opening therethrough;

a coating station having a dispensing assembly and a fluid collection head, the coating station being positioned with the dispensing assembly above the slot and the fluid collection head below the opening in the channel,

the dispensing assembly having a dispensing cannula, and the fluid collection head having vacuum means for pulling fluid in a reagent dispensed from the dispensing cannula through a porous support positioned in the guide channel; and

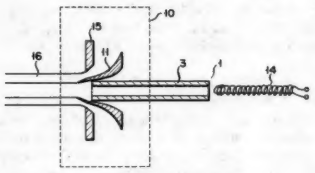
reciprocating means for decreasing the distance between the dispensing assembly and the fluid collection head so that a porous support and its cover positioned in the guide channel between the dispensing assembly and the fluid collection head is contacted by the fluid collection head on its lower surface and is sufficiently close to the dispensing cannula that a reagent dispensed from the dispensing cannula will contact the porous support in the area defined by the aperture in the cover.

4,873,127

METHOD OF MAKING HEAT TRANSFER TUBE

Kagetoshi Onodera, Chiba; Tatsuya Koizumi; Toshiyuki Kato, both of Tokyo; Junji Sotani; Masauki Momo, both of Yokohama, and Shuichi Furuya, Kawasaki, all of Japan, assignors to The Fukura Electric Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 77,073, Jul. 24, 1987, abandoned, which is a continuation of Ser. No. 846,606, Mar. 31, 1986, abandoned.
This application Jun. 21, 1988, Ser. No. 211,084
Claims priority, application Japan, Oct. 3, 1983, 58-153468[U]; Aug. 2, 1984, 59-163419; Sep. 28, 1984, 59-147112[U]; Oct. 19, 1984, 59-158019[U]; Feb. 18, 1985, 60-21751[U]; Mar. 18, 1985, 60-38634[U]; Apr. 17, 1985, 60-57095[U]; Oct. 30, 1985, 60-167199[U]
Int. Cl.[4] B05D *3/02, 7/14*
U.S. Cl. 427—376.8 3 Claims



1. A method of manufacturing a heat transfer tube, comprising the steps of:

placing an intermediate metal layer having a low melting point around an inner tube formed of copper or steel;

heating the intermediate layer to a temperature above its melting point to metalurgically bond it to the inner tube; and

coating the molten intermediate layer with lead or a lead alloy while the intermediate layer is in a molten state to form an outer layer around the inner tube.

4,873,128
PROCESS FOR PULTRUDING FIBER REINFORCED PHENOLIC RESIN PRODUCTS

Chen-chi M. Ma, Bartlesville, Okla., and Wen-cheng Shih, Taichung, Taiwan, assignors to National Science Council, Taiwan

Filed Mar. 7, 1988, Ser. No. 164,548
Int. Cl.[4] B05D *1/18;* B29G *2/00, 7/00*
U.S. Cl. 427—434.7 **15 Claims**

1. A process for pultruding fiber reinforced phenolic resin products which comprises drawing a plurality of continuous filaments through an impregnating bath of liquid phenolic resin to saturate the filaments with said resin and a squeeze orifice for removal of excess resin and air, and continuously pulling the resin filament composite through a pultrusion die to heat and cure said resin, characterized in that the liquid phenolic resin normally has a viscosity ranging from 3,000 to 5,000 cps at 25° C. and is heated to 45°–65° C. to have a viscosity ranging from 800 to 2,000 cps during the impregnating step, wherein the pultrusion die has at least three zones therein and the last zone has a temperature below the temperature of a preceding zone.

4,873,129
MAGNETIC RECORDING MEDIUM

Hajime Fukke, Tama, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 16, 1988, Ser. No. 156,457
Claims priority, application Japan, Feb. 18, 1987, 62-33248
Int. Cl.[4] G11B *5/70*
U.S. Cl. 428—694 **8 Claims**

1. A coating magnetic recording medium which comprises a non-magnetic substrate and at least two magnetic films different from one another formed on said substrate, each of said films comprising a ferromagnetic powder dispersed in a polymeric binder and being provided on the same side surface of the non-magnetic substrate in different regions; each of said magnetic films being formed separately by a process comprising coating on the non-magnetic substrate a coating material which contains a radiation-curable resin in the polymeric binder, then, by means of photolithography, leaving only a desired part behind and removing another part with an organic solvent and, thereafter, curing the desired part on the non-magnetic substrate.

4,873,130
COATING PROCESS FOR THE PREPARATION OF COHERENT PROTECTIVE LAYER

John W. Nicholson, Hampton, and Alan D. Wilson, Liphook, both of England, assignors to National Research Development Corporation, England

Continuation of Ser. No. 846,904, Apr. 1, 1986, abandoned. This application Aug. 22, 1988, Ser. No. 235,389
Claims priority, application United Kingdom, Apr. 1, 1985, 8508461
Int. Cl.[4] B27N *5/02;* B05D *3/02*
U.S. Cl. 428—35.8 **14 Claims**

1. A process for the preparation of a coherent protective layer on a substrate surface of a body, the substrate surface comprising elemental metal or an alloy thereof, which process comprises reacting (i) a compound of a group IA metal, effective in aqueous media to convert a free carboxylic acid group to a carboxylate group with (ii) an aqueous solution consisting of water and a homopolymer of a mono- or polybasic ethylenically unsaturated acid or a copolymer of a mono- or polybasic ethylenically unsaturated acid comprising at least 40 mol % of polymerized unsaturated carboxylic acid residues, the amount of (i) being sufficient to neutralize from 5 to 20% of the acid groups of said homo-or copolymer (ii); applying to the substrate surface the aqueous solution consisting of water and partially neutralized homo- or copolymer of a mono- or polybasic ethylenically unsaturated acid resulting from said reaction; and heat-curing the layer so formed at a temperature above 180° C.

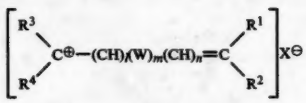
4,873,131
OPTICAL RECORDING MEDIUM

Toshihiro Kashima, Ootsu, and Minoru Fukuda, Nagaokakyo, both of Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed Mar. 23, 1988, Ser. No. 172,142
Claims priority, application Japan, Mar. 23, 1987, 62-69736; Mar. 30, 1987, 62-79397; Apr. 8, 1987, 62-85948; Apr. 9, 1987, 62-87673; Jul. 2, 1987, 62-165943; Jul. 7, 1987, 62-170443
Int. Cl.[4] B32B *3/02;* G11B *3/70*
U.S. Cl. 428—64 **3 Claims**

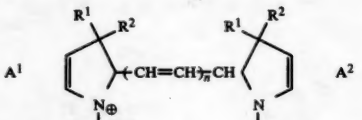
1. An optical recording medium having a thin film layer consisting mainly of an organic dye and formed on a substrate, characterized in that said thin film layer consists mainly of a dye mixture comprising a polymethine dye (A) and an aza-annulene dye (B), the polymethine dye (A) being selected from those represented by the general formula (III) and (IV):

[III]

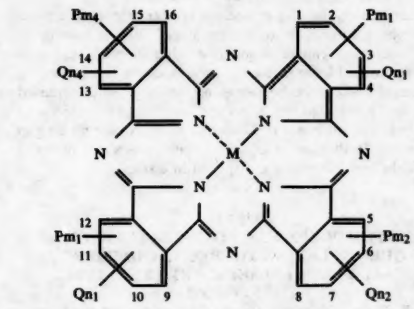


wherein each of R^1, R^2, R^3 and R^4 represents hydrogen atom, alkyl group, substituted alkyl group, aryl group, substituted aryl group or heterocyclic group W represents a cyclohexene ring or a condensed ring containing at least one cyclohexene ring or at least one substituted cyclohexene ring; of the 1 and n represents 0 or an integer of 1 to 3 and satisfies the relation $0<+n<5$; m is a number of 0 or 1; and X^- represents an anion; and,

[IV]

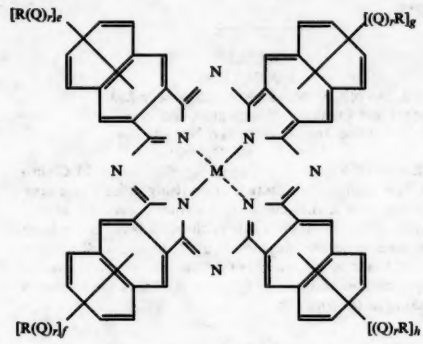


wherein n is 0 or an integer of from 1 to 3; R^1, R^2 and R^3 may be the same or different and each represents an alkyl group having 1 to 6 carbon atoms; X represents halogen, perhalogenate, boron tetrafluoride, toluenesulfonate or alkyl sulfate; each of A^1 and A^2 represents benzene ring or naphthyl ring and each of these rings may be substituted by any of alkyl groups, alkoxy groups, hydroxy group, carboxyl group, halogen, aryl groups and alkylcarboxyl groups, and the aza-annulene dye (B) being selected from those represented by the general formula and:



[I]

wherein the numerals 1 to 16 denote the respective carbon atom positions; each of m_1, m_2, m_3 and m_4 represents the number of groups P which may be same or different and the number is an integer of from 0 to 4; each of n_1, n_2, n_3 and n_4 represents the number of groups Q which may be the same or different and the number is an integer of from 0 to 4; two or more of the carbon atoms bearing the numbers 1 to 16 are substituted amino, imino, nitro, cyano, sulfonic acid, sulfonate, sulfonyl, hydroxyl and halogen; 3 to 8 of the carbon atoms bearing the numbers 1 to 16 are substituted by the groups Q; Q is represented by $(Z)_rR$ wherein Z represents $—CH^2—$, —O—, —CONH— or —COO— and R represents a straight or branched alkyl group or aryl group and r represents a number of 0 or 1; and M represents hydrogen, metal, metal oxide, metal hydroxide or metal halide;



[II]

wherein -[(Q)rR] represents substituents which may be same or different, Q is any of —O—, —CONR'—, —NR'CO—, —COO— and —OCO—, wherein R' is hydrogen or alkyl group having 4 or less carbon atoms, R represents a group selected from straight or branched alkyl groups having 4 to 18 carbon atoms, and aryl and cyclohexyl groups having 6 to 18 carbon atoms; e, f, g and h represent the numbers of the respective substituents and each of them is a number of 0 to 4, (e+f+g"h) being >3; M represents hydrogen, metal, metal oxide, metal hydroxide or metal halide; and r represents a number of 0 or 1; the dyes (A) and (B) being those in which the maximum absorption wavelength λ_{max}·A (nm) of the dye (A) and the maximum absorption wavelength λ_{max}·B (nm) of the dye (B) satisfy the relation defined by the formula:

$$-80 \leqq \lambda_{max}\cdot B - \lambda_{max}\cdot A \leqq 300,$$

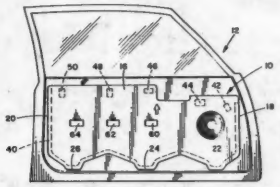
the ratio of the dye(A)/dye(B) being 95/5 to 10/90.

4,873,132

SURFACE PROTECTOR WITH EXPANSIBLE POCKET

Wallace R. Jones, Waite Hill Village, and Robert A. Isaksen, Chardon, both of Ohio, assignors to The Excello Specialty Company, Cleveland, Ohio

Continuation of Ser. No. 883,826, Jul. 9, 1986, Pat. No. 4,696,848. This application Sep. 21, 1987, Ser. No. 98,805
The portion of the term of this patent subsequent to Sep. 29, 2004, has been disclaimed.
Int. Cl.[4] B32B *3/02*
U.S. Cl. 428—80 **9 Claims**



1. A shield device for use in protecting a surface comprising:
(a) a generally flat and relatively thin sheet of flexible plastic material having a peripheral edge shaped to generally conform to the shape of the surface to be protected; and,
(b) a predetermined area of said sheet being at least partially enclosed by a series of relatively small and closely spaced deformations formed to extend outwardly of the plane of the sheet a short distance for permitting said predetermined area to be selectively deflected laterally of the plane of the sheet to form a pocket for generally conforming to a discontinuity in said surface, said predetermined area being substantially in the plane of said sheet until an external force is applied to produce lateral deflection.

4,873,133

FIBER REINFORCED STAMPABLE THERMOPLASTIC SHEET

Harold F. Giles, Jr., Cheshire, Mass., assignor to General Electric Company, Pittsfield, Mass.

Filed Sep. 11, 1986, Ser. No. 905,995
Int. Cl.[4] B32B *5/06, 5/12, 17/04, 27/12, 31/20*
U.S. Cl. 428—107 **18 Claims**

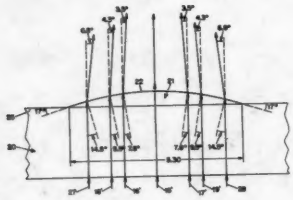
1. A fiber reinforced stampable sheet obtained by laminating (a) a thermoplastic resin surface layer and (b) a reinforcing fiber mat comprising (i) a thermoplastic resin support film having a melting point below the temperature of lamination and (ii) long fibers penetrating the support film and positioned by said support film, a major portion of said long fibers being positioned on one side of said support film, a minor portion of said long fibers being positioned on an opposite side of said support film, said minor portion of fibers being positioned adjacent said surface layer.

4,873,134

HOT MELT INK PROJECTION TRANSPARENCY

Steven J. Fulton, Hanover, N.H.; Charles W. Spehrley, Jr., Hartford, Vt., and Lawrence R. Young, West Lebanon, N.H., assignors to Spectra, Inc., Hanover, N.H.

Filed Aug. 10, 1988, Ser. No. 230,797
Int. Cl.[4] B41M 5/00
U.S. Cl. 428—156 7 Claims



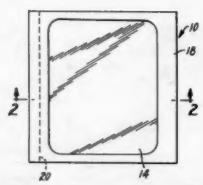
1. A transparency comprising a transparent substrate and an ink pattern on the surface of the substrate containing a plurality of three-dimensional ink spots having curved surfaces, wherein the contact angle of the spots with the substrate is no more than about 25°.

4,873,135

PREFRAMED TRANSPARENCY FILM HAVING IMPROVED FEEDING RELIABILITY

Bruce W. Wittnebel, White Bear Lake; Kerry D. Reimer, Hugo, and Leonard F. Miller, Lakeland, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jan. 29, 1988, Ser. No. 149,856
Int. Cl.[4] B32B 23/02; G03G 15/04
U.S. Cl. 428—192 9 Claims



1. A sheet material suitable for preparing visual transparencies comprising

(a) a backing that is transparent to visible light,

(b) an image receptive layer transparent to visible light adhered to at least one major surface of said backing,

(c) an anti-blocking layer transparent to visible light adhered to at least one major surface of said backing,

said sheet material having an opaque border extending around the periphery thereof, said sheet material further having an area of increased caliper along one edge thereof, said area extending inward from said edge for a distance not exceeding the width of said opaque border along said edge, said increased caliper being effected by a strip of thin material adhesively applied to one of said anti-blocking layer or said image receptive layer, said increased caliper being of sufficient thickness so as to provide an air gap between the leading edge of an adjacent like sheet material when said sheet materials are disposed in a stack.

9. A sheet material suitable for preparing visual transparencies comprising

(a) a backing that is transparent to visible light,

(b) an image receptive layer transparent to visible light adhered to at least one major surface of said backing,

(c) an anti-blocking layer transparent to visible light adhered to at least one major surface of said backing,

said sheet material having an opaque border extending around the periphery thereof, said sheet material further having an area of increased caliper along one edge thereof, said area extending inward from said edge for a distance not exceeding the width of said opaque border along said edge, said increased caliper being effected by a printed coating, said increased caliper being of sufficient thickness so as to provide an air gap between the leading edge of an adjacent like sheet material when said sheet material are disposed in a stack.

4,873,136

METHOD FOR PREPARING POLYMER SURFACES FOR SUBSEQUENT PLATING THEREON, AND IMPROVED METAL-PLATED PLASTIC ARTICLES MADE THEREFROM

Donald F. Foust; Edward J. Lamby, both of Scotia; Bradley R. Karas, Amsterdam; William V. Dumas, Delanson, and Elihu C. Jerabek, Glenmont, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jun. 16, 1988, Ser. No. 207,462
Int. Cl.[4] B32B 3/00, 7/00; B44C 1/22; H05K 1/00
U.S. Cl. 428—209 32 Claims

27. An article comprising

(A) a polyimide substrate which has been pretreated by mild etching of the surface, contact of the surface with a basic solution, and contact of the surface with a cationic surfactant which is capable of removing a residual film formed on the surface after the mild etching step, followed by treatment with an adhesion-promoting compound;

(B) an electrolessly-applied metal layer disposed on the substrate; and

(C) an electrolytically-applied metal layer free of chemical additives disposed on top of the electrolessly-applied layer.

4,873,137

FOOD TRAY

Edward J. Deyrup, Northeast, Md., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 2, 1988, Ser. No. 201,234
Int. Cl.[4] B32B 7/02
U.S. Cl. 428—216 21 Claims

1. A rigid composite structure comprising at least one core layer comprising a thermoplastic polymeric material and at least one outer layer on each side of the core layer comprising polyethylene terephthalate and about 10 to about 60 percent glass flake, based on the weight of the outer layers, wherein the core layer comprises about 25% to about 90% of the thickness of the composite structure.

4,873,138

METALLIC THIN FILM TYPE MAGNETIC RECORDING MEDIUM

Tsutomu Okita, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 90,382, Aug. 27, 1987, abandoned, which is a continuation of Ser. No. 757,581, Jul. 22, 1985, abandoned, which is a continuation of Ser. No. 582,666, Feb. 23, 1984, abandoned. This application Oct. 18, 1988, Ser. No. 309,327
Claims priority, application Japan, Feb. 24, 1983, 58-28644
Int. Cl.[4] G11B 5/64
U.S. Cl. 428—336 28 Claims

1. A magnetic recording medium comprising:

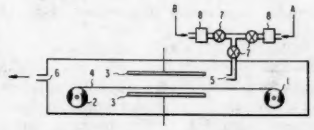
a polymer support base;

a ferromagnetic metal thin film on the polymer support base;

a plasma polymerization layer having a thickness of 20 to 270 A as provided on the ferromagnetic metal thin film by plasma polymerization of a gaseous low molecular com-

pound at a pressure of the gaseous low molecular compound of from 1 to 1×10^{-4} Torr; and

a lubricating layer on the plasma polymerization layer, wherein said lubricating layer is formed from a compound which has a carbon-carbon unsaturated group at a terminal position thereof and contains at least 8 carbon atoms, and being strongly bound onto the plasma polymerization layer after plasma polymerization by reaction of radical active sites generated by the plasma polymerization and the carbon-carbon unsaturated bonds.



4,873,139
CORROSION RESISTANT SILVER AND COPPER SURFACES

David S. Kinosky, Austin, Tex., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 29, 1988, Ser. No. 174,837
Int. Cl.[4] B32B *27/06*
U.S. Cl. 428—341 **6 Claims**

1. An article comprising a plastic film having a layer of silver supported thereon, wherein said silver layer has been contacted with a compound selected from the group consisting of 2-mercaptobenzoxazole and 1-phenyl-1H-tetrazole-5-thiol; wherein said compound is present on said silver layer in an amount of at least about 0.001 gram per square meter; and further comprising a film-forming coating on said silver layer.

4,873,140
ARTICLES HAVING LOW ADHESION ARTICLES HAVING COATINGS THEREON

Daniel K. McIntyre, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Apr. 27, 1988, Ser. No. 186,955
Int. Cl.[4] C09J *7/02*; B32B *27/08*
U.S. Cl. 428—343 **16 Claims**

12. A pressure-sensitive adhesive tape comprising a flexible substrate having a low surface energy coating on one surface thereof, said coating comprising an in situ polymerized monofunctional poly(perfluoropropyleneoxy) acrylate or methacrylate oligomer, the poly(perfluoropropyleneoxy) segments of which have a number average molecular weight of about 1200 to 10,000, and said substrate having a pressure-sensitive adhesive on the second surface of said substrate opposite said low surface energy coated surface.

4,873,141
HIGH MECHANICAL STRENGTH WATER RESISTANT INSULATING MATERIAL AND A METHOD FOR PREPARING THE SAME

Vida Popovic, Kraljevo, Yugoslavia, assignor to Quill-Quartz GmbH, Munich, Fed. Rep. of Germany

Filed Apr. 2, 1986, Ser. No. 847,200
Claims priority, application Yugoslavia, Apr. 13, 1985, 553185
Int. Cl.[4] D02G *3/00*
U.S. Cl. 428—357 **4 Claims**

1. A calcium-hydrosilicate based material having thermal and electrical insulating properties, sound and vibration damping properties, high mechanical strength, and permanent water and CO_2 resistance, comprising at least 80% by weight of 11Å tobermorite having a fibrous structure, said material comprising a bulk density of about 100–280 kg/m^3, an apparent thermal conductivity of about 0.06978–0.1W/mK, a compressive resistance of about 1,500,000–1,900,000 n/m^2, a maximum linear shrinkage of 2% after 24 hours at a mean temperature of 1273.15° K., thermal stability at temperatures exceeding 1573° K., and a flexural strength of 980,600–1,000,000N/m^2.

4,873,142
ACRYLIC FIBERS HAVING SUPERIOR ABRASION/FATIGUE RESISTANCE

Hartwig C. Bach, Pensacola, Fla., assignor to Monsanto Company, Del.

Continuation of Ser. No. 847,991, Apr. 3, 1986, abandoned. This application Sep. 30, 1987, Ser. No. 104,555
Int. Cl.[4] D02G *3/00*
U.S. Cl. 428—359 **4 Claims**

1. A wet-spun tow consisting of at least 1000 filaments consisting of a copolymer of acrylonitrile and one or more vinyl monomers copolymerizable therewith, wherein from 85% to 98% by weight of its units are acrylonitrile units of the formula

$$-CH_2-\underset{\displaystyle CN}{\underset{|}{CH}}-,$$

said filaments being characterized in having a mercury density greater than 1.0 grams/cc, an average flex fatigue parameter of at least −0.11, a tenacity of at least 2.0 gpd, knot strengths of at least 90% of the tenacity and an elongation in the range of 35% to 60% and in containing from 0.001 to 1.0% by weight of dimethylformamide.

4,873,143
WATER-SWELLABLE FIBER

Kojii Tanaka, Okayama, Japan, assignor to Japan Exlan Company Limited, Osaka, Japan

Continuation-in-part of Ser. No. 32,720, Apr. 1, 1987, abandoned. This application Sep. 20, 1988, Ser. No. 246,959
Claims priority, application Japan, May 6, 1986, 61-104140
Int. Cl.[4] D02G *3/00*
U.S. Cl. 428—373 **2 Claims**

1. A water-swellable fiber exhibiting a degree of water swelling of 3 times or more and satisfying the following requirements (a)–(f):

(a) it is composed of a hydrophilic crosslinked polymer (I) and another polymer (II),

(b) it has a cross-sectional structure such that at least a part of the polymer (I) is situated as an outer layer,

(c) the proportion of the polymer (I) is not larger than 60% based on the total volume of the fiber,

(d) it contains and links carboxyl groups thereto in a quantity of from 0.3 to 4.0 m mol/g,

(e) the degree of neutralization of the carboxyl groups is less than 0.1, and

(f) the degree of water swellability is 10 times or less, by causing to adhere to said fiber such a quantity of carbonate or hydrogen carbonate whose cationic component is an alkali-metal as to make the degree of neutralization of the carboxyl groups from 0.1 to 0.7.

2. A water-swellable polyacrylonitrile fiber exhibiting a degree of water swelling of 3 times or more and satisfying the following requirements (a)–(f):

(a) it has a cross-sectional structure having an outer layer of a hydrophilic crosslinked acrylonitrile polymer (I) and a core of an uncrosslinked acrylonitrile fiber (II),

(b) the proportion of the polymer (I) is not larger than 60% based on the total volume of the fiber,

(c) it contains and links carboxyl groups thereto in a quantity of from 0.3 to 4.0 m mol/g,

(d) the degree of neutralization of the carboxyl groups is less than 0.1, and

(e) the degree of water swellability is 10 times or less, by causing to adhere to said fiber such a quantity of carbonate

or hydrogen carbonate whose cationic component is an alkali-metal as to make the degree of neutralization of the carboxyl groups from 0.1 to 0.7.

4,873,144

FIBER FOR COMPOSITE REINFORCEMENT WITH ANTI-BLOCKING FINISH

Robert M. Marshall, Chester, Va., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Nov. 4, 1985, Ser. No. 794,366

Int. Cl.[4] D02G *3/00*

U.S. Cl. 428—395 **15 Claims**

1. A high tenacity reinforcing fiber selected from the group consisting of polyester, aliphatic polyamide, and combinations thereof, for reinforcing plastic composites, said fiber being coated with a composition comprising:

(a) an aqueous solution of carboxyl-terminated, oil-free alkyd resin consisting essentially of the reaction product of at least one aliphatic glycol containing 2 to 12 carbons with a combination of aromatic di- and trifunctional carboxylic acids, said resin having a degree of esterification below the gel point of the resin to enhance stiffness of the fiber for cutting, and

(b) an aqueous emulsion of oxidized polyethylene, said oxidized polyethylene being present in an amount sufficient to provide enhanced anti-blocking properties to the coated fiber.

4,873,145

RESIN-COATED AGGREGATES

Takeji Okada, Yokohama; Minoru Sawaide, Narashino; Minoru Imai, Yokohama, and Daisuke Tachibana, Tokyo, all of Japan, assignors to Shimitzu Construction Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 738,603, May 28, 1985, abandoned. This application Nov. 26, 1986, Ser. No. 935,182

Claims priority, application Japan, May 31, 1984, 59-111609; May 31, 1984, 59-111610

Int. Cl.[4] C04B *7/02;* B05D *7/00*

U.S. Cl. 428—407 **12 Claims**

1. A substantially water-resistant resin coated aggregate for use in concrete comprising a porous aggregate body and a water-resistant layer having a thickness of from about 20 to about 50 μm made of a mechanically strong phenol resin coated on said porous aggregate body, said porous aggregate body selected from the group consisting of artificial light weight aggregates and natural light weight aggregates said mechanically strong phenol resin comprising a reaction product of novolak and hexamethylenetetramine.

4,873,146

TRANSPARENT FIRE-SCREENING PANELS

Francois Toussaint, Montignies-le-Tilleul, and Pierre Goelff, Nalinnes, both of Belgium, assignors to Glaverbel, Brussels, Belgium

Filed Nov. 27, 1987, Ser. No. 125,994

Claims priority, application Luxembourg, Dec. 1, 1986, 86691

Int. Cl.[4] B32B *9/00, 17/06;* B27N *9/00;* C09K *21/00*

U.S. Cl. 428—428 **19 Claims**

18. A process of manufacturing a transparent fire-screening glazing panel comprised of at least one solid layer of intumescent material comprising a hydrated alkali metal silicate held sandwiched between two sheets of glazing material, the process comprising:

incorporating at least one silicate-stabilizing agent which inhibits loss of transparency by haze formation in the at least one solid intumescent material layer into an aqueous solution of said hydrated alkali metal silicate;

drying said aqueous solution to form grains; and

sandwiching said grains between said two sheets of glazing material.

4,873,147

PROCESS FOR WATERPROOFING STARCH BINDERS

Johannes J. Jansen; Bernardus H. F. Mossou, and Hans Poort, all of Veendam, Netherlands, assignors to Coöperatieve Verkoop- en Produtievereniging van Aardappelmeel en Derivaten 'AVEBE' B.A., Veendam, Netherlands

Filed Feb. 11, 1988, Ser. No. 155,042

Claims priority, application Netherlands, Feb. 11, 1987, 8700330

Int. Cl.[4] B32B *3/26, 5/16, 23/04*

U.S. Cl. 428—533 **5 Claims**

1. A process for applying waterproof starch layers to substrates, which comprises the steps of applying an aqueous starch dispersion containing a starch-reacting waterproofing agent to the substrate and then drying same, wherein the waterproofing agent or a catalyst which catalyzes the reaction of the waterproofing agent with the starch molecules is distributed through the starch dispersion enclosed in microcapsules, and wherein after applying said starch dispersion to the substrate, the waterproofing agent is reacted with the starch molecules by breaking down the microcapsules, thus releasing said agent or said catalyst.

5. A substrate provided with a waterproof starch layer prepared by the process according to any one of claims 1–4.

4,873,148

COATED METALLIC PARTICLES AND PROCESS FOR PRODUCING SAME

Preston B. Kemp, Jr., Athens, and Robert J. Holland, Sr., Sayre, both of Pa., assignors to GTE Products Corporation, Stamford, Conn.

Continuation of Ser. No. 918,181, Oct. 14, 1986, Pat. No. 4,818,567. This application Sep. 19, 1988, Ser. No. 233,394

Int. Cl.[4] B22F *1/00;* B32B *5/16*

U.S. Cl. 428—570 **7 Claims**

1. Metallic coated particles comprising a core consisting essentially of a material selected from the group consisting of metals, metal alloys, ceramics, and ceramic glasses, and a coating consisting essentially of a relatively ductile and/or malleable metallic material selected from the group consisting of metals and metal alloys, said coated particles being produced by a process comprising the steps of (a) increasing the aspect ratio of relatively ductile and/or malleable metallic powder particles selected from the group consisting of metal powder particles and metal alloy powder particles to greater about 50 to 1 by relatively high speed milling, and (b) mechanically applying the resulting ductile and/or malleable metallic particles having the increased aspect ratio to a powder material selected from the group consisting of metal powder particles, metal alloy powder particles, ceramic powder particles, and ceramic glass powder particles, by relatively low speed milling, said powder material being sufficiently less deformable than said ductile and/or malleable metallic powder to allow said ductile and/or malleable particles to coat said powder material.

4,873,149

VIBRATION-DAMPER METAL SHEETS

Kenichi Shinoda; Tomoyoshi Iwao; Tomoaki Isayama, and Yuichi Higo, all of Hiroshima, Japan, assignors to Nisshin Steel Co., Ltd., Tokyo, Japan

PCT No. PCT/JP87/00402, § 371 Date Mar. 28, 1988, § 102(e) Date Mar. 28, 1988, PCT Pub. No. WO87/07872, PCT Pub. Date Dec. 30, 1987

PCT Filed Jun. 18, 1987, Ser. No. 177,524

Claims priority, application Japan, Jun. 20, 1986, 61-142709; Aug. 1, 1986, 61-180151

Int. Cl.[4] B32B *7/00*

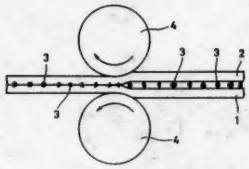
U.S. Cl. 428—609 **10 Claims**

1. A vibration-damping metal sheet, comprising:

metal plates, and

minute inclusions joining said metal plates together, said

minute inclusions being substantially and uniformly present between said metal plates and biting into said metal plates, said metal plates contacting each other but not



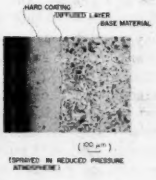
being metallurgically joined to each other at portions where said minute inclusions are not present, said minute inclusions biting into a projection area of 0.5 to 50% of the area of said metal plates.

4,873,150

HIGH WATER-RESISTANT MEMBER, AND VALVE GEAR USING THE SAME FOR USE IN INTERNAL COMBUSTION ENGINE

Masayuki Doi, Katsuta; Naotatsu Asahi, Matsudo; Yoshitaka Kojima, Hitachi; Hisanobu Kanamaru, Katsuta, and Susumu Aoyama, Kashiwa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 26, 1987, Ser. No. 112,493
Claims priority, application Japan, Oct. 27, 1986, 61-255261
Int. Cl.[4] F01L *1/00*
U.S. Cl. 428—627 **37 Claims**



35. A valve gear for use in an internal combustion engine which is adapted to employ a thrust generated by the rotation of a cam to cause a valve stem to reciprocally move, said valve gear comprising metal members which are maintained in sliding contact with each other, at least one of said metal members having a sliding surface provided with a hardened and tempered sprayed layer consisting essentially of, by weight, 2 to 10% C, 18 to 60% Cr, 0.3 to 20% V, 25% or less Mo, 25% or less W, 10% or less Nb, 10% or less Ti, 10% or less Zr, 10% or less Hf and the balance being Fe in a proportion of 20% or greater, said sprayed layer having a surface hardness of 1000 Hv or greater and having a martensite-phase matrix containing at least carbide particles with a width of 3 μm or less and an areal ratio of 25 to 90% and said sprayed layer further having a surface provided with a carburized layer, a nitrided layer or a carbonitrided layer.

4,873,151

ALUMINUM NITRIDE CIRCUIT SUBSTRATE

Hideki Sato, and Nobuyuki Mizunoya, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 8, 1987, Ser. No. 71,132
Claims priority, application Japan, Jul. 11, 1986, 61-161784
The portion of the term of this patent subsequent to Aug. 2, 2005, has been disclaimed.
Int. Cl.[4] B32B *15/04*
U.S. Cl. 428—627 **17 Claims**

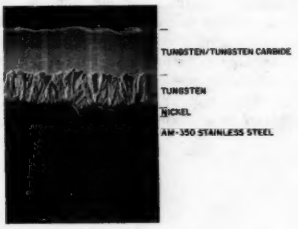
1. An aluminum nitride circuit substrate comprising:
an aluminum nitride plate comprising a bonding surface; and
a conductive material having a thermal expansion coefficient substantially similar to that of AlN bonded to said aluminum nitride plate through a metallized layer fomred on the bonding surface of the aluminum nitride plate, said conductive material being of a metallic material which has a thermal expansion coefficient of 2×10^{-6} to 6×10^{-6}/° C.

4,873,152

HEAT TREATED CHEMICALLY VAPOR DEPOSITED PRODUCTS

Diwakar Garg, Macungie, Pa.; Paul N. Dyer, Allentown, Pa., and Duane Dimos, Upper Mount Clair, N.J., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Feb. 17, 1988, Ser. No. 157,550
The portion of the term of this patent subsequent to Aug. 8, 2006, has been disclaimed.
Int. Cl.[4] B32B *15/04*
U.S. Cl. 428—627 **5 Claims**



1. A coated substrate product which comprises a fine-grained, non-columnar outer coating and a columnar intermediate layer of tungsten between said substrate and said outer coating, said outer coating comprising a chemical vapor deposited mixture of tungsten and tungsten carbide wherein the tungsten carbide phase consists of W_2C or W_3C or a mixture of W_2C and W_3C and wherein the coated substrate has been heat treated at a temperature in the range from about 300° C. to about 500° C. in a non-reactive atmosphere for a period of time sufficient to confer substantially higher erosion and abrasive wear resistance to the outer coating than the coating in its unheat treated condition but which does not result in substantial degradation of the mechanical properties of the substrate and has a substantially layered substantially uniform microstructure substantially free of cracks.

4,873,153

HOT-DIP GALVANIZED COATING FOR STEEL

George T. Miller, Lewiston, N.Y., assignor to Occidental Chemical Corporation, Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 66,366, Jun. 25, 1987. This application Aug. 28, 1987, Ser. No. 93,946
Int. Cl.[4] B32B *15/18*; B05D *1/18*
U.S. Cl. 428—659 **12 Claims**

1. An article having improved resistance welding characteristics consisting essentially of a steel substrate having a hot-dip

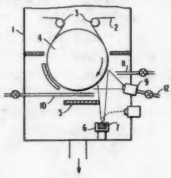
coating of zinc metal or a zinc alloy containing discrete particles of at least one metal phosphide selected from the group consisting of phosphides of iron, tin, titanium, manganese, tungsten, vanadium, tantalum, and mixtures thereof, said hot-dip coating being applied to the steel substrate by immersing the substrate in a molten bath of zinc or zinc alloy and spraying the molten zinc or zinc alloy with said discrete particles whereby said discrete particles are deposited on the surface of said zinc or zinc alloy.

4,873,154

MAGNETIC RECORDING MEDIUM CONTAINING FE, CO, N AND O

Tadashi Yasunaga, and Akio Yanai, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 3, 1988, Ser. No. 151,722
Claims priority, application Japan, Feb. 4, 1987, 62-24378
Int. Cl.[4] G11B *5/64*
U.S. Cl. 428—694 **3 Claims**



1. A magnetic recording medium, comprising a non-magnetic support having provided thereon a thin ferromagnetic metal film comprising iron of atomic percentage a, cobalt of atomic percentage b, nitrogen of atomic percentage c and oxygen of atomic percentage d, wherein said atomic percentages of said iron, cobalt, nitrogen and oxygen are based on the total number of these atoms and have the following limits:

$32 \leqq a \leqq 90$;

$5 \leqq b \leqq 55$;

$2 \leqq c \leqq 28$;

$5 \leqq d \leqq 23$; and

$c+d \leqq 40$.

4,873,155

FUEL CELL MANIFOLDS

Toshio Hirota; Takashi Ohuchi, and Osamu Yamamoto, all of Kanagawa, Japan, assignors to Fuji Electric Co., Ltd., Kanagawa, Japan

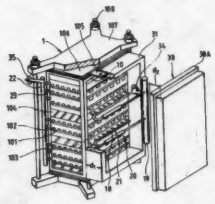
Filed Nov. 9, 1988, Ser. No. 268,921
Claims priority, application Japan, Nov. 10, 1987, 62-283834; Oct. 18, 1988, 63-261796
Int. Cl.[4] H01M *8/02*
U.S. Cl. 429—26 **4 Claims**

1. A fuel cell manifold for supplying and removing reaction gases, mountable airtightly on the side walls of a fuel cell stack formed by stacking individual cells in a column, and in which electrolyte and cooling solution are charged and discharged through pipes penetrating the manifold, the manifold comprising:

a seal layer covering the periphery of one of the walls of the fuel cell stack;

a frame-shaped seal spacer having one side in airtight contact with the seal layer, the seal spacer including a bore for securing airtightly a penetrating portion of one of the pipes; and,

a manifold cover mounted airtightly on the opposite side of the seal spacer with a packing, the depth of the manifold



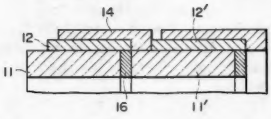
cover being large enough to accommodate the pipes protruding from the seal spacer.

4,873,156

SOLID ELECTROLYTIC FUEL CELL AND METHOD FOR MANUFACTURING SAME

Tokuki Satake; Hiroshi Sakai; Hayami Nakatani; Masaharu Nakamori, and Masaru Ishibashi, all of Hyogo, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 30, 1987, Ser. No. 102,652
Claims priority, application Japan, Sep. 30, 1986, 61-232781; Dec. 17, 1986, 61-300710
Int. Cl.[4] H01M *8/10*
U.S. Cl. 429—31 **4 Claims**



1. A cylindrical solid electrolytic fuel cell which comprises:

at least an oxygen electrode which is a porous cylinder of $CaTiO_3$ forming an innermost layer of said fuel cell and having a thickness of 1 mm or more;

at least a solid electrolyte covering an outer peripheral surface of said oxygen electrode;

at least a fuel electrode covering an outer peripheral surface of said solid electrolyte; and

an intermediate connector attached to said outer peripheral surface of said oxygen electrode in the axial direction;

wherein said solid electrolyte has said intermediate connector interposed therein, and said intermediate connector and said fuel electrode are spaced.

4,873,157

RECOMBINANT ELECTRIC STORAGE BATTERY

Robert P. Flicker, Topton, and Scott Fenstermacher, Kutztown, both of Pa., assignors to East Penn Manufacturing Co., Inc., Lyon Station, Pa.

Filed Jul. 5, 1988, Ser. No. 214,754
Int. Cl.[4] H01M *10/06*
U.S. Cl. 429—57 **1 Claim**

1. A recombinant storage battery comprising

a plurality of positive plates containing about 2 to 4 percent of antimony based upon the total weight of the alloy and positive active material, and essentially antimony free negative plates in a closed case;

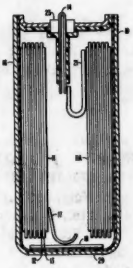
a fibrous sheet plate separator between adjacent ones of said plates, and a body of an electrolyte to which said sheet separators are inert absorbed by each of said separators and maintained in contact with each of the adjacent ones of said plates, each of said separator sheets comprising first

fibers which impart to the sheet a given absorbency greater than 90 percent relative to said electrolyte and second fibers which impart to the sheet a different absorbency less than 80 percent relative to said electrolyte, the first and second fibers being present in such proportions that each of said sheet separators has an absorbency with respect to said electrolyte of from 75 to 95 percent and the second fibers being present in such proportions that the battery has a recombination rate adequate to compensate for gassing.

4,873,158
OVERDISCHARGE PROTECTION FOR RECHARGEABLE CELLS

On-Kok Chang; John C. Hall, San Jose; Jeffrey Phillips, Saratoga, and Lenard F. Silvester, Scotts Valley, all of Calif., assignors to Altus Corporation, San Jose, Calif.

Filed Sep. 14, 1988, Ser. No. 244,488
Int. Cl.[4] H01M *2/00, 4/02, 2/14*
U.S. Cl. 424—61 **5 Claims**



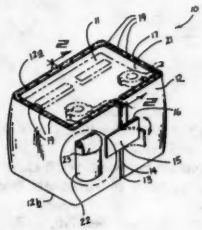
1. A rechargeable electrochemical cell comprising a cell casing having side-walls, a top and bottom housing therein a positive terminal, a negative terminal, an anode of alkaline metal connected to the negative terminal, a cathode connected to the positive terminal, a non-aqueous electrolyte, a first microporous membrane separating said anode from said cathode being characterized as allowing the flow of electrolyte through the pores of the first microporous membrane but inhibiting passage of alkaline metal dendrites therethrough, a tab of conductive material extending from the anode to a portion proximate said cell casing and a second microporous membrane located between said tab and cell casing, said second microporous membrane being characterized as being less resistant to passage of alkaline metal dendrites than said first microporous membrane.

4,873,159
BATTERY BLANKET DEVICE

Albert Ciriello, 179 S. Windemer Ave., Thunder Bay, Ontario, Canada P7B-4M7

Filed Jan. 9, 1989, Ser. No. 295,135
Int. Cl.[4] H01H *2/02*
U.S. Cl. 429—120 **7 Claims**

1. A battery blanket device for securement about a battery comprising, in combination,
a battery, and
an elongate flexible exterior layer including a top edge, a bottom edge, a first end, and a parallel second end wherein said first and second end are in a contiguous adjacent relationship in securement of said device about said battery, and
securement means for tautly securing said first end relative to said second end, and
a dispensing member laminated to an interior surface of said exterior layer, and

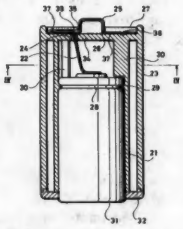


applicator means formed integrally to said top edge for directing an acid neutralizing fluid to said dispenser member.

4,873,160
RECHARGEABLE BATTERY

Noriyuki Miyazaki, and Tetsunori Matsuoka, both of Hyogo, Japan, assignors to Sanyo Electric Co., Ltd., Japan

Filed Nov. 7, 1988, Ser. No. 268,163
Claims priority, application Japan, Nov. 10, 1987, 62-283613
Int. Cl.[4] H01M *2/6*
U.S. Cl. 429—170 **12 Claims**



1. A rechargeable battery comprising:
an internal cell having a pair of electrodes;
an insulated cylindrical case having an internal space for holding said internal cell and end walls provided on both ends thereof, said insulated cylindrical case substantially conforming to a prescribed conventional battery in outside dimension;
an insulated cover plate having an opening in its center and being provided on one of said end walls of said case; and
a first auxiliary terminal having a flange portion held by said one of said end walls of said case and said cover plate to be supported by the same and a projection protruding from said central opening of said cover plate, saif first auxiliary terminal being electrically connected to one of said electrodes of said internal cell.

4,873,161
POSITIVE PASTE WITH LEAD-COATED GLASS FIBERS

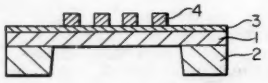
Wally E. Rippel, 3308 Alegre La., Altadena, Calif. 91101, and Dean B. Edwards, 852 N. Grant St., Moscow, Id. 83843

Filed Aug. 19, 1988, Ser. No. 234,094
Int. Cl.[4] H01M *4/14*
U.S. Cl. 429—225 **16 Claims**

1. A positive paste for a lead-acid battery comprising:
a layer of positive active material comprising lead dioxide containing a dispersion of 0.1 to 10% by volume of light-

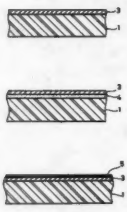
weight, reinforcement fibers containing a lead coating formed of a high modulus core fiber.

4,873,162
X-RAY MASK AND A MANUFACTURE METHOD THEREFOR
Nobuyuki Yoshioka; Nobuo Fujiwara, and Yaichirou Watakabe, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan
Filed Aug. 14, 1987, Ser. No. 85,210
Claims priority, application Japan, Aug. 20, 1986, 61-195991; Mar. 20, 1987, 62-66254
Int. Cl.[4] G03F *1/00*
U.S. Cl. 430—5 9 Claims



1. An x-ray mask comprising:
a mask substrate that is permeable to x-rays; and
an x-ray absorber disposed on said substrate and formed into a pattern, said absorber being made from a Ti-W alloy with a Ti content of approximately 0.5–10 weight % in a sufficient thickness to absorb x-rays.

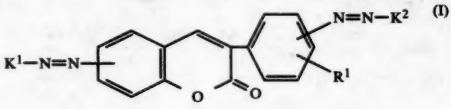
4,873,163
PHOTOMASK MATERIAL
Yaichiro Watakabe; Hiroaki Morimoto, and Tatsuo Okamoto, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Continuation of Ser. No. 48,989, May 11, 1987, abandoned, which is a continuation of Ser. No. 777,715, Sep. 13, 1985, abandoned. This application Aug. 8, 1988, Ser. No. 229,769
Claims priority, application Japan, Oct. 16, 1984, 59-217838
Int. Cl.[4] G03F *1/00*
U.S. Cl. 430—5 11 Claims



1. A photomask material blank for manufacturing a semiconductor device, said photomask material comprising:
a mask blank in the form of a transparent substrate; and
a silicide film of a transition metal selected from the group consisting of molybdenum, tantalum and tungsten formed on said transparent substrate and formed by one of sputtering, ionized cluster beam and CVD.

4,873,164
ELECTROPHOTOGRAPHIC PHOTORECEPTOR COMPRISING A CHARGE TRANSPORT MEDIUM AND A BIS-AZO COMPOUND CONTAINING OXYGEN
Hitoshi Ono, Yokohama, and Yoshiaki Kato, Mitaka, both of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan
Filed May 11, 1988, Ser. No. 192,456
Claims priority, application Japan, May 14, 1987, 62-117933; Jan. 12, 1988, 63-4564
Int. Cl.[4] G03G *5/06*
U.S. Cl. 430—58 14 Claims

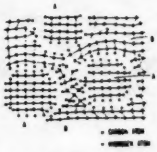
1. An electrophotographic photoreceptor having on a conductive base a photosensitive layer comprising a medium for transporting a charge carrier and a bis-azo compound represented by the general formula (I):



(I)

wherein K^1 and K^2 are independently a coupling ingredient residue with a hydroxy group which has a coupling activity; R^1 is a hydrogen atom, a lower alkyl group, a lower alkoxy group or a halogen atom.

4,873,165
ELECTROPHOTOGRAPHIC PHOTORECEPTOR HAVING OVERLAYER COMPRISING CARBON
Ken-ichi Karakida, and Shigeru Yagi, both of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan
Filed Jan. 15, 1988, Ser. No. 144,006
Claims priority, application Japan, Jan. 16, 1987, 6047
Int. Cl.[4] G03G *5/082, 5/14*
U.S. Cl. 430—66 12 Claims



1. An electrophotographic photorecorder which comprises
(1) a support;
(2) a light-sensitive layer comprising an i-type semiconductor layer that is predominantly composed of amorphous silicon and contains a small amount of an element of group IIIB of the periodic table; and
(3) a surface layer having a thickness of from 0.01 to 10 μm provided on the i-type semiconductor layer, said surface layer being predominantly composed of carbon and containing an element capable of forming a tetrahedral bond.

4,873,166
LIQUID DEVELOPER FOR ELECTROPHOTOGRAPHY
Takao Senga; Kazuchiyo Takaoka; Hirokazu Yamamoto, and Takimi Hashimoto, all of Nagaokakyo, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan
Filed Mar. 31, 1987, Ser. No. 33,002
Claims priority, application Japan, Mar. 31, 1986, 61-74505; Mar. 31, 1986, 61-74507; Apr. 2, 1986, 61-77358; Jan. 19, 1987, 62-11087; Jan. 20, 1987, 62-11743
Int. Cl.[4] G03G *9/12, 11/00*
U.S. Cl. 430—137 14 Claims

1. A process for producing a liquid developer for electrostatic photography which comprises a highly insulating hydrocarbon medium which is a liquid having an electric resistance

of 10^9 Ω-cm or more and a permittivity of 3.5 or less and resin particles dispersed therein, said process comprising polymerizing a monomer (A) soluble in said medium, but insolubilized upon being polymerized in the presence of a polymer (S) insoluble in said medium and having a carboxyl group, a hydroxyl group or an amide group.

4,873,167

SELF CLEANING SHEET FOR DISSOLVING A PHOTO-SENSITIVE MATERIAL CONTAINING MICROCAPSULES ON BOTH SIDES OF SUBSTRATE

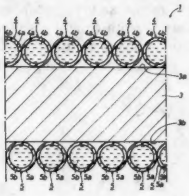
Yuji Asano, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Mar. 8, 1988, Ser. No. 165,465

Claims priority, application Japan, Mar. 11, 1987, 62-55795

Int. Cl.[4] B41M *5/12*; G03C *1/68*

U.S. Cl. 430—138 **7 Claims**



1. A self cleaning sheet comprising:

a sheet of substrate; and

microcapsules enveloping a solvent of a photo-curable material and being coated on said sheet of substrate, said solvent selected from the group consisting of isopropyl alcohol, butanol, ethyl alcohol, propyl alcohol, methyl alcohol, acetone, ethyl ketone and methyl ketone.

4,873,168

IMAGING SYSTEM UTILIZING HEAT TREATMENT

Donna L. Ruder, Dayton; Lyudmila Feldman, Centerville, and James A. Dowler, Franklin, all of Ohio, assignors to The Mead Corporation, Dayton, Ohio

Filed Mar. 7, 1988, Ser. No. 164,653

Int. Cl.[4] G03C *5/54, 1/68, 5/00*

U.S. Cl. 430—138 **14 Claims**

1. A method for treating an imaging sheet comprising the steps of:

providing an imaging sheet having coated on one of its surfaces a layer of microcapsules, said microcapsules containing a radiation curable composition and having an image-forming agent associated therewith;

heating said sheet; and

image-wise exposing said layer of microcapsules to actinic radiation;

wherein said heating step is performed prior to said image-wise exposing step.

4,873,169

PROCESS FOR THE PREPARATION OF AN O-NAPHTHOQUINONEDIAZIDE SULFONIC ACID ESTER AND PHOTOSENSITIVE MIXTURE CONTAINING SAME

Fritz Erdmann, Eltville-Martinsthal; Horst-Dieter Thamm, Eschborn, and Hans-Joachim Staudt, Taunusstein, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Filed Aug. 20, 1987, Ser. No. 87,599

Claims priority, application Fed. Rep. of Germany, Aug. 27, 1986, 3629122

Int. Cl.[4] G03C *1/54, 1/60*; C07C *113/00*

U.S. Cl. 430—192 **18 Claims**

1. A process for the preparation of an o-naphthoquinone diazide sulfonic acid ester comprising the steps of:

mixing an o-naphthoquinone diazide sulfonic acid halide with a mono- or polyvalent phenolic compound in a solvent;

adding a basic component selected from the group consisting of ammonia, ammonium salts of weak acids and monohydroxy aliphatic amine with 1 to 3 carbon atoms or dihydroxy aliphatic amine with 1 to 3 carbon atoms;

controlling the pH within the range from about 1.5 to about 8.5 and the temperature within the range from about 15° C. to about 40° C. to carry out an esterification reaction producing an o-naphthoquinone diazide sulfonic acid ester; and

precipitating the o-naphthoquinone diazide sulfonic acid ester produced.

2. An o-naphthoquinoe diazide sulfonic acid ester having less than about 1 p.p.m. of any metal ion, prepared by the process according to claim 1.

3. A photosensitive mixture comprising a photosensitive o-naphthoquinone diazide sulfonic acid ester prepared by the process according to claim 1 in admixture with from about 50 to 90% of a binder which is insoluble in water and soluble in aqueous-alkaline solutions.

4,873,170

METHOD FOR MAKING LITHOGRAPHIC PRINTING PLATE

Hiroshi Nishinoiri; Masahiko Saikawa; Yoshikazu Takaya, and Euji Kanada, all of Nagaokakyo, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

Filed Aug. 6, 1987, Ser. No. 82,318

Claims priority, application Japan, Aug. 14, 1986, 61-191475; Apr. 17, 1987, 62-94497

The portion of the term of this patent subsequent to Nov. 15, 2005, has been disclaimed.

Int. Cl.[4] G03C *5/54*; G03F *7/06*

U.S. Cl. 430—204 **7 Claims**

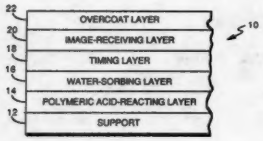
1. A method for making a lithographic printing plate utilizing silver complex diffusion transfer process which comprises subjecting to scanning exposure of highintensity short-time a light sensitive material comprising a support and, provided thereon, at least a silver halide emulsion layer and a physical development nuclei layer as a surface layer and then developing it with a silver complex diffusion transfer developer, the improvement which comprises subjecting the light sensitive material to imagewise exposure with scanning light of at least 700 nm, said emulsion layer containing silver halide grains mainly composed of silver chloride and a sensitizing dye having a sensitivity maximum in the long wavelength region of at least 700 nm in an amount of 3×10^{-5}-3×10^{-4} mol for 1 mol of silver halide and an antihalation means being provided below said emulsion layer to provide a reflectance of 13–40% for the scanning exposure light of at least 700 nm.

4,873,171

IMAGE-RECEIVING ELEMENT FOR DIFFUSION TRANSFER PHOTOGRAPHIC PRODUCT

Louis J. George, Somerville, and Lloyd D. Taylor, Lexington, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed May 2, 1988, Ser. No. 188,897
Int. Cl.[4] G03C 5/54
U.S. Cl. 430—213 **17 Claims**



1. An image-receiving element for photographic diffusion transfer processing comprising in order:

a support layer;

a polymeric acid-reacting layer;

a water-permeable and water-absorbing polymeric layer, said layer being effective to absorb water introduced into said image-receiving element during said diffusion transfer processing;

a water-impermeable polymeric timing layer through wich aqueous alkali must pass to said polymeric acid-reacting layer, said polymeric timing layer being deposited from a polymeric latex and being essentially non-absorbing of water and being substantially impermeable for a predetermined time interval to the passage of aqueous alkali therethrough, said polymeric timing layer including a polymer comprising polymerized repeating units, which as a function of contact with aqueous alkaline processing composition and after said predetermined time interval, undergo an alkali-initiated chemical reaction effective to convert said timing layer from a condition of substantial impermeability to the passage of aqueous alkali to a condition of substantial permeability thereto; and

a water-permeable and dyeable image-receiving layer.

14. The image-receiving element of claim **1** wherein said water-permeable and dyeable image-receiving layer comprises a mixture of polyvinyl alcohol and a mordant for dye-image forming material.

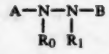
4,873,172

PROCESS FOR FORMING A SUPERHIGH CONTRAST NEGATIVE IMAGE

Shoji Ishiguro; Shigeo Hirano; Tadao Shishido, all of Kanagawa, and Akio Miyake, Osaka, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

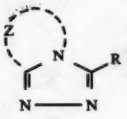
Continuation of Ser. No. 857,270, Apr. 30, 1986, abandoned. This application Aug. 8, 1988, Ser. No. 229,796
Claims priority, application Japan, Apr. 30, 1985, 60-93324
Int. Cl.[4] G03C 1/06
U.S. Cl. 430—264 **15 Claims**

1. A process for forming a superhigh contrast negative image comprising development processing a photographic light-sensitive material comprising a support having provided thereon at least one silver halide emulsion layer with a developer containing not less than 0.5 mol/liter of a sulfite ion and having a pH of from 10.5 to 12.3, wherein the development processing is carried out in the presence on a compound represented by formula (I)

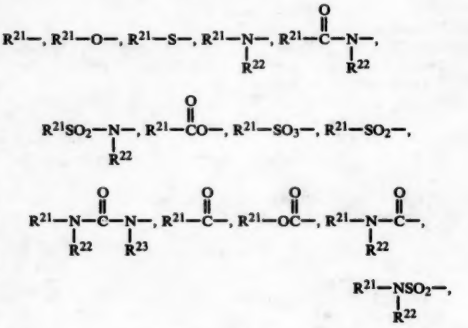

(I)

wherein A represents an aliphatic group or an aromatic group; B represents a formyl group, an acyl group, an alkyl sulfonyl group, an arylsulfonyl group, an alkyl sulfinyl group, an arylsulfinyl group, a carbamoyl group, a sulfamoyl group, an alkoxycarbonyl group, an aryloxycarbonyl group, a sulfinamoyl group, an alkoxysulfonyl group, a thioacyl group, a thiocarbamoyl group, or a heterocyclic group; R_0 and R_1 each represent a substituent selected from the group consisting of a hydrogen atom, a substituted or unsubstituted alkylsulfonyl group and a substituted or unsubstituted acyl group, provided that at least one of R_0 and R_1 is a hydrogen atom; or B, R_1, and the nitrogen atom to which B and R_1 are bonded jointly form the group

wherein R_2 represents a substituent selected from the group consisting of an alkyl group, an aryl group, and a heterocyclic group, and R_3 represents a substituent selected from the group consisting of a hydrogen atom, an alkyl group, an aryl group, and a heterocyclic group; and a compound represented by formula (II)


(II)

wherein Z represents an atomic group comprising atoms selected from carbon atoms and nitrogen atoms forming a 5- to 7-membered unsaturated heterocyclic or condensed heterocyclic ring, wherein said condensed heterocyclic ring is condensed with a monocyclic or dicyclic aryl group and wherein said atomic group is unsubstituted or substituted by a group selected from the group consisting of an alkyl, aryl, alkoxy, aryloxy, alkylthio, arylthio, halogen, acylamino, sulfonamido, ureido, cyano, carboxyl, carbamoyl, sulfamoyl, acyloxy, alkoxycarbonyl, aryloxycarbonyl, acyl, amino, imino, nitroso, alkynyl and sulfonyl groups and wherein said unsaturated condensed heterocyclic ring is condensed with a monocyclic or dicyclic aryl group; and R represents one substituent selected from the group consisting of



[$R^{21}OO_3S$—] $R^{21}O_3S$—, —COOH, a halogen atom, and

—CN, wherein R^{21}, R^{22} and R^{23} are each selected from the group consisting of a hydrogen atom, an aliphatic group or an aromatic group.

4,873,173

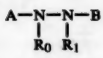
METHOD OF FORMING IMAGE PROVIDING A CHANGE IN SENSITIVITY BY ALTERING THE PH OF THE DEVELOPER

Senzo Sasaoka; Tetsuo Yoshida, and Nobuaki Inoue, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 21, 1987, Ser. No. 110,981
Claims priority, application Japan, Oct. 21, 1986, 61-249872
Int. Cl.[4] G03C 5/24, 1/06
U.S. Cl. 430—964 10 Claims

1. A method of forming an image comprising the steps of:

(a) imagewise exposing a photographic material which comprises a support having provided thereon at least one light-sensitive silver halide emulsion layer and which contains a hydrazine compound represented by the following general formula (I) in said emulsion layer or a hydrophilic colloid layer adjacent thereto:



(I)

wherein A represents a substituted or unsubstituted aliphatic group, or a substituted or unsubstituted aromatic group; B represents a formyl group, an acyl group, an alkylsulfonyl group, an arylsulfonyl group, an alkylsulfinyl group, an arylsulfinyl group, a carbamoyl group, an alkoxycarbonyl group, an aryloxycarbonyl group, a sulfinamoyl group, an alkoxysulfonyl group, a thioacyl group, a thiocarbamoyl group, a sulfamoyl group, or a heterocyclic group; both R_0 and R_1 represent a hydrogen atom, or one of them represents a hydrogen atom and the other represents a substituted or unsubstituted alkylsulfonyl group, a substituted or unsubstituted arylsulfonyl group, or a substituted or unsubstituted acyl group; and B, R_1 and the nitrogen atom attached thereto may form a partial structure of hydrazone,

and

(b) developing said exposed material with a developer (A) having a sulfite ion concentration of 0.15 mole/l or more, a potassium ion concentration of 0.2 mole/l or more, and a pH value ranging from 10.5 to 12.3; wherein a gamma value of said material developed with developer (A) is at least 10, a gamma value of said material developed with a developer (B) that is the same as the developer (A) except that the pH value is lowered by 1.0 is at least 5, and a difference in sensitivity between said material developed with the developer (A) and that developed with the developer (B) is at most 0.7 wherein the sensitivity is defined as log E corresponding to the density of fog+2.0.

4,873,174

METHOD OF USING DEVELOPER-FINISHER COMPOSITIONS FOR LITHOGRAPHIC PLATES

Major S. Dhillon, Belle Mead; Shane Hsieh, Bridgewater, and Douglas A. Seeley, High Bridge, all of N.J., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Filed Feb. 3, 1988, Ser. No. 151,652
Int. Cl.[4] G03C 5/34
U.S. Cl. 430—309 6 Claims

1. A method of treating a photographic element which comprises imagewise exposing a positive working or negative working photographic element to sufficient actinic radiation to form a latent image thereon, and then removing the non-image portions thereof and finishing said element with:a developing and finishing composition comprising in admixture:

a.from about 0.1% to about 10.0% by weight of the composition of one or more compounds selected from the group consisting of mono-, di-, or trisodium, potassium or lithium phosphate; and

b. from about 0.1% to about 10.0% by weight of the composition of one or more compounds selected from the group consisting of benzyl alcohol, phenoxyethanol and phenoxypropanol; and

c. from about 0.1% to about 10.0% by weight of the composition of one or more resins selected from the group consisting of polyvinyl pyrrolidone, dextrin, poly (methyl vinyl ether/maleic acid) and gum arabic; and

d. from about 0.1% to about 10.0% by weight of the composition of one or more acids selected from the group consisting of citric acid and benzoic acid; and

e. from about 0.5% to about 15.0% by weight of the composition of one or more compounds selected from the group consisting of sodium or potassium octyl sulfate; and

f. from about 1.0% to about 15.0% by weight of the composition of one or more compounds selected from the group consisting of sodium, potassium and lithium benzoate; and

g. from about 0.2% to about 10.0% by weight of the composition of one or more components selected from the group consisting of sodium, potassium and ammonium citrate; and

h. from about 0.2% to about 15.0% by weight of the composition of one or more components selected from the group consisting of sodium, potassium and ammonium sorbate; and

i. sufficient water to formulate an effective developer.

4,873,175

METHOD OF FORMING FUNCTIONAL COATING FILM BETWEEN FINE ELECTRIC CONDUCTIVE CIRCUITS

Tameyuki Suzuki, Kanagawa, and Takuro Kamakura, Chiba, both of Japan, assignors to Shinto Paint Co., Ltd., Amagasaki, Japan

Filed Dec. 29, 1986, Ser. No. 947,332
Claims priority, application Japan, Jan. 8, 1986, 61-1534
Int. Cl.[4] G03C 5/00
U.S. Cl. 430—311 3 Claims

1. (Four Times Amended) A method of forming a functional coating film on spaces of a fine electric conductive circuit pattern of a transparent base board comprising the steps of:

(i) forming a light-shielding precoat film on said electric conductive circuit pattern by electrode position of a coating agent having a light-shielding property and reagent solubility;

(ii) forming a photo-setting coating film by applying a functional material having photo-curability to an entire part of said transparent base board including said precoat film;

(iii) exposing a back surface of said transparent base board to light for curing portions of said photo-setting coating film which are not shielded by said light-shielding precoat film; and

(iv) removing the uncured portions of said photo-setting coating film, which has been un-exposed in the step (iii), and said light-shielding precoat film, formed in the step (i), with the same reagent in a single process.

4,873,176

RETICULATION RESISTANT PHOTORESIST COATING

Thomas A. Fisher, Cambridge, Mass., assignor to Shipley Company Inc., Newton, Mass.

Filed Aug. 28, 1987, Ser. No. 90,753
Int. Cl.[4] G03F 7/26; H01L 21/312
U.S. Cl. 430—313 7 Claims

1. A process for etching an integrated circuit substrate, said

process comprising the steps of forming an imaged and developed positive working photoresist coating over said integrated circuit substrate, said photoresist prior to imaging and developing comprising a binder selected from the group of novolak resins and polyvinyl phenol resins, a photoactive naphthoquinone diazide sulfonic acid ester and an essentially unreacted acid activated cross-linking agent, and subjecting said coated substrate to an etching plasma in a gaseous stream that contains a Lewis acid during etching whereby a cross-linked surface layer is formed on said photoresist wherein the concentration of the acid activated cross-linking agent is sufficient to form a surface layer of cross-linked photoresist over the imaged photoresist film adequate to prevent significant reticulation of the photoresist image during plasma etching.

4,873,177

METHOD FOR FORMING A RESIST PATTERN ON A SUBSTRATE SURFACE AND A SCUM-REMOVER THEREFOR

Hatsuyuki Tanaka; Yoshiyuki Sato, both of Samukawa; Hidekatsu Kohara, Chigasaki, and Toshimasa Nakayama, Hiratsuka, Japan, assignors to Tokyo Ohka Kogyo Co., Ltd., Japan

Continuation of Ser. No. 15,215, Feb. 17, 1987, abandoned. This application Aug. 5, 1988, Ser. No. 229,762

Claims priority, application Japan, Feb. 24, 1986, 61-38755; Mar. 17, 1986, 61-57162

Int. Cl.[4] G03C *5/24, 5/34*

U.S. Cl. 430—326 **3 Claims**

1. A method for forming a pattern-wise photoresist layer on the surface of a substrate which comprises the steps of:

(a) forming a layer of photo-working photoresist composition on the surface of a substrate;

(b) exposing the layer of the positive-working photoresist pattern-wise to actinic rays to increase the solubility of the photoresist composition on the areas exposed to the actinic rays;

(c) dissolving away the layer of the photoresist composition on the areas exposed to the actinic rays with a developer solution to leave a pattern-wise photoresist layer on the surface of the substrate; and

(d) rinsing the substrate with the pattern-wise photoresist layer on the surface thereof with a scum-remover solution which is a mixture of 100 parts by weight of an aqueous solution of from 0.5 to 1.5% by weight of tetramethylammonium hydroxide or trimethyl 2-hydroxymethyl ammonium hydroxide, and from 1 to 30 parts by weight of a water-miscible organic solvent.

4,873,178

OPTICAL RECORDING MEDIUM AND METHOD FOR CONDUCTING RECORDING ON SAID MEDIUM

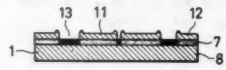
Masahiro Haruta; Yoko Kuwae, both of Tokyo; Hirohide Munakata; Satoshi Yuasa, both of Yokohama, and Etsuko Sugawa, Machida, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 807,954, Dec. 12, 1985, abandoned. This application Jan. 19, 1988, Ser. No. 147,577

Claims priority, application Japan, Dec. 18, 1984, 59-265457; Dec. 18, 1984, 59-265459

Int. Cl.[4] G03C *11/00;* **G01D** *15/10*

U.S. Cl. 430—327 **8 Claims**



1. A method for recording on an optical recording medium comprising a non-electroconductive substrate layer, a light-transmissive surface layer and a colored film formed by electrolytic polymerization and interposed between the substrate layer and the surface layer, the method comprising the step of applying light to the recording medium in such a manner that the colored film of the recording medium generates heat in response to the applied light, to melt the surface layer to form pits therein, wherein the colored film is selected from a polymer film formed from a monomer unit selected from the group consisting of pyrrole, N-methylpyrrole, thiophene, furan, selenophene, tellurophene , indole , azulene, aniline, thienothiophene, pyrrolopyrrole and diacetylene.

4,873,179

METHOD FOR PROCESSING A SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL WHILE REPLENISHING WASHING WATER AND STABILIZING SOLUTION

Akira Abe; Keiji Mihayashi, and Seiji Ichijima, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 20, 1987, Ser. No. 52,086

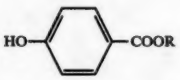
Claims priority, application Japan, May 20, 1986, 61-115792

Int. Cl.[4] G03C *7/16, 7/40, 7/32, 11/00*

U.S. Cl. 430—382 **52 Claims**

1. A method for processing a silver halide color photographic material which comprises, after color development of a silver halide color photographic material comprising a support having thereon at least one light-sensitive silver halide emulsion layer and at least one compound capable of releasing, after reaction with an oxidation produce of a developing agent, a development inhibitor upon a reaction with another molecule of an oxidation produce of a developing agent, treating said photographic material with a liquid having a fixing ability, and thereafter washing or stabilizing said photographic material while replenishing the washing water and stabilizing solution, respectively, each in an amount of from 2 to 50 times the amount carried over from the preceding bath per unit area of the silver halide color photographic material, wherein the silver halide color photographic material contains a p-hydroxybenzoic acid ester represented by formula (PHB)

(PHB)



wherein R represents an alkyl group, a substituted alkyl group, an aralkyl group, or a substituted aralkyl group each having from 1 to 18 carbon atoms in total.

4,873,180

DEVELOPER COMPOSITIONS FOR SILVER HALIDE PHOTOGRAPHIC MATERIALS COMPRISING CYCLIC AMINO METHANE DIPHOSPHONIC ACID COMPOUNDS

Carlo Marchesano; Franco Buriano, and Enrico Furlanetto, all of Savona, Italy, assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 6, 1988, Ser. No. 178,251

Claims priority, application Italy, Apr. 13, 1987, 20087 A/87

Int. Cl.[4] G03C *5/30, 7/16*

U.S. Cl. 430—491 **13 Claims**

1. An alkaline aqueous developer composition for silver halide photographic materials which comprises a silver halide developing agent and a cyclicaminomethane diphosphonic acid compound sequestering agent.

4,873,181

SILVER HALIDE PHOTOGRAPHIC MATERIAL

Nobuaki Miyasaka, and Shuzo Suga, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

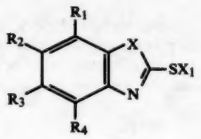
Continuation of Ser. No. 822,498, Jan. 27, 1986, abandoned. This application May 31, 1988, Ser. No. 206,922

Claims priority, application Japan, Jan. 25, 1985, 60-11066

Int. Cl.[4] G03C *1/76*

U.S. Cl. 430—523 14 Claims

1. A silver halide photographic material comprising a support bearing on at least one side thereof at least one silver halide photographic emulsion layer and at least one auxiliary layer, wherein the silver halide photographic emulsion layer is a layer made of a light-sensitive silver halide emulsion containing silver iodide and an internally fogged silver halide emulsion, or is composed of a layer made of the light-sensitive silver halide emulsion containing silver iodide and a layer made of the internally fogged silver halide emulsion, and the auxiliary layer contains substantially non-light-sensitive silver halide grains having an average grain size of not more than 0.5μm and is provided outside of and on the same side of the support as a light sensitive emulsion layer which is the outermost light-sensitive emulsion layer from the support, and wherein the amount of the substantially non-light-sensitive silver halide grains coated is from 1×10^{-4} to 1×10^{-2} mol/m^2 and wherein said silver halide photographic material contains no metallic salts coated with a less solubilizing agent, wherein the substantially non-light-sensitive silver halide grains comprise at least 75 mol % silver chloride, and have absorbed on the surface thereof at least one compound represented by formula (I)



(I)

wherein X is —O—, —NH— or —S—; R_1, R_2, R_3 and R_4 each represents a hydrogen atom or a substituted group, at least one of R_1, R_2, R_3 and R_4 being a substituted or unsubstituted alkyl or aryl group having 13 carbon atoms or less which is linked, directly or through a divalent connecting group, to the benzene nucleus of formula (I); and X_1 represents a hydrogen atom or a cation necessary for rendering the molecule neutral.

4,873,182

LIGHT-SENSITIVE SILVER HALIDE PHOTOGRAPHIC MATERIALS AND PROCESS FOR INCORPORATING HYDROPHOBIC PHOTOGRAPHIC ADDITIVES INTO HYDROPHILIC COLLOID COMPOSITIONS

Ivano Delprato, and Agostino Baldassarri, both of Savona, Italy, assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 28, 1988, Ser. No. 187,271

Claims priority, application Italy, May 8, 1987, 20435 A/87

Int. Cl.[4] G03C *1/38, 7/32*

U.S. Cl. 430—546 12 Claims

1. A light-sensitive silver halide photographic material comprising a support and a hydrophilic colloid layer coated thereon, said hydrophilic colloid layer containing hydrophobic photographic additives dispersed in fine droplets of one or more water-immiscible high boiling organic solvents, wherein at least one of said solvents is an alkyleneglycol aliphatic diester compound corresponding to the general structural formula wherein R_1 and R_2, the same or different, each represents an unsubstituted alkyl group having 1 to 15 carbon atoms, Q represents a linear unsubstituted alkylene group of 1 to 10 carbon atoms or linear halogen substituted alkylene group of 1 to 10 carbon atoms, m represents 0 or 1, and the total number of carbon atoms represented in R_1+R_2 is at least 6.

3. The light-sensitive silver halide photographic material of claim 1, wherein said hydrophobic photographic additive is a dye-forming coupler.

4,873,183

SILVER HALIDE COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING PYRAZOLOAZOLE TYPE CYAN COUPLER

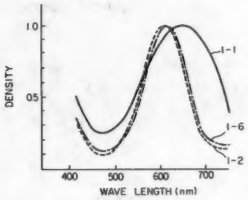
Kimie Tachibana, Hino; Yutaka Kaneko, Sagamihara, and Fumio Ishii, Akishima, all of Japan, assignors to Konica Corporation, Tokyo, Japan

Continuation of Ser. No. 124,987, Nov. 24, 1987, abandoned. This application Dec. 29, 1988, Ser. No. 291,351

Claims priority, application Japan, Nov. 25, 1986, 61-280164; Dec. 27, 1986, 61-313455; Mar. 2, 1987, 62-47323; Mar. 9, 1987, 62-53417; Mar. 17, 1987, 62-62162; Mar. 17, 1987, 62-62163; Jul. 23, 1987, 62-184552

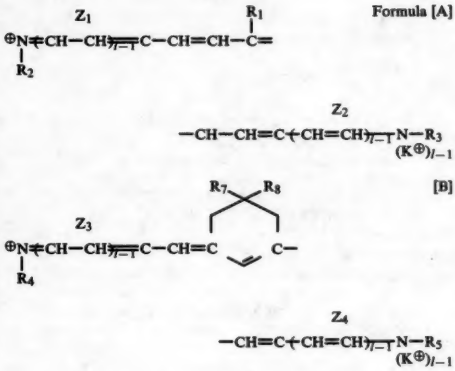
Int. Cl.[4] G03C *7/38*

U.S. Cl. 430—550 11 Claims



1. A light-sensitive silver halide color photographic material comprising a support and, provided thereon, a red light-sensitive silver halide emulsion layer containing a pyrazoloazole type cyan dye-forming coupler having at least one electron attractive group at a substitutable position except the active site of the coupler for coupling reaction.

11. The light-sensitive silver halide color photographic material of claim 1, wherein said red light-sensitive emulsion layer contains a spectral sensitizing dye selected from the group consisting of ones represented by formulas [A], [B], [C], [D], [E] and [F]:



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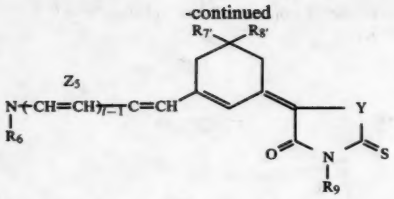
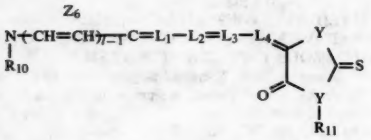
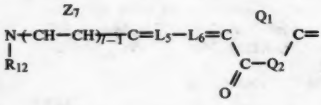
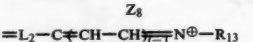


[C]

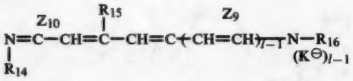


[D]





[E]



[F]

wherein Z_1 through Z_9 each represent a group of atoms necessary for completing a benzene ring or a naphthalene ring condensed with a pyridine ring, an imidazole ring, a thiazole ring, a selenazole ring, an oxazole ring or a tetrazole ring; Z_{10} represents a group of atoms necessary for completing a benzothiazole ring, a benzoselenazole ring a β-naphthothiazole ring a β-naphthoselenazole ring, a benzimidazole ring or a 2-quinoline ring; Q_1 and Q_2 each represent a group of atoms necessary for associatively completeing a nucleus of 4-thiazolidinone, 5-thiazolidinone or 4-imidazolidinone; R_1 and R_{15} each represent a hydrogen atom, an alkyl group or an aryl group; R_7, R_8, R'_7 and R_8, each represent an alkyl group; R_9 and R_{11} each represent an alkyl group, an aryl group or a heterocyclic group; R_2, R_3, R_4, R_5, R_6, R_{10}, R_{12}, R_{13}, R_{14} and R_{16} each represent an alkyl group or an aryl group;

l is an integer of 1 or 2; Y represents a sulfur atom or selenium atom; L_1 through L_6 each represent a substituted or nonsubstituted methine group; and K represents an acid anion.

4,873,184

SUPERSENSITIZATION OF SILVER HALIDE PHOTOTHERMOGRAPHIC EMULSIONS

Sharon M. Simpson, Lake Elmo, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Feb. 5, 1988, Ser. No. 152,755

Int. Cl.[4] G05C *1/08, 1/12*

U.S. Cl. 430—617 **25 Claims**

1. A spectrally sensitized silver halide photothermographic emulsion layer comprising a reducible silver source material as 20 to 70% by weight of said emulsion layer, photosensitive silver halide, and a reducing agent for silver ion, said silver halide having no latent image therein and being present as 1.5 to 7.0% by weight of said emulsion layer and said emulsion layer having a speed increasing effective amount of a metal complexing agent therein in an amount equal to 0.4 to 40% by weight of total silver in said emulsion.

4,873,185

ONE-COMPONENT TONER FOR DRY ELECTROPHOTOGRAPHY CONTAINING METAL COMPLEX AS CHARGE CONTROL AGENT

Mitsuru Uchida, Chohfu; Satoshi Yasuda, Matsudo, and Tetsuya Kuribayashi, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

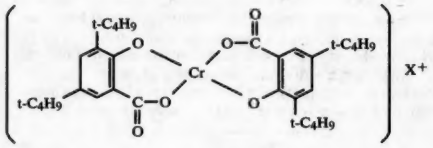
Filed Jul. 2, 1987, Ser. No. 69,498

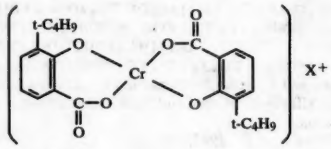
Claims priority, application Japan, Jul. 3, 1986, 61-155145

Int. Cl.[4] G03G *9/14*

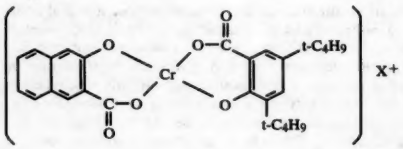
U.S. Cl. 430—903 **15 Claims**

1. A dry electrophotographic negatively chargeable one-component type magnetic toner, comprising: a binder resin, magnetic powder, negatively chargeable particles of a metal complex compound (A) of an aromatic hydroxy carboxylic acid having a lipophilic group represented by the formula selected from the group consisting of:

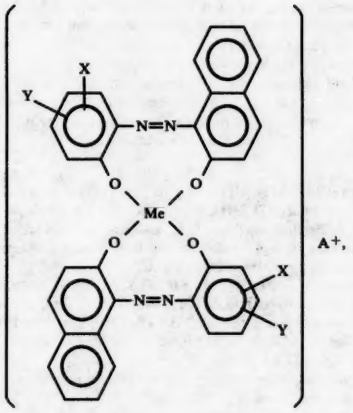




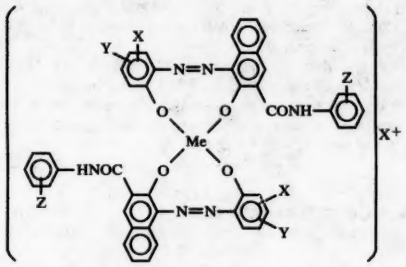
and



wherein X^+ denotes a counter ion, and negatively chargeable particles of a metal complex salt-type monoazo dye (B) having a hydrophilic group represented by the formula selected from the group consisting of



wherein X and Y denotes the same or different groups of hydrogen, halogen, carboxyl, hydroxyl, nitro, sulfo or sulfamide; Me denotes a metal atom; and A^+ denotes a counter ion; provided that at least one of the X and Y denotes a group other than hydrogen; and



wherein X, Y and Z denote the same or different groups of hydrogen, halogen, carboxyl, hydroxyl, nitro, sulfo or sulfamide; Me denotes a metal atom; and A^+ denotes a counter ion; provided that at least one of X, Y and Z denotes a group other than hydrogen; said metal complex compound (A) and monoazo dye (B) being added each in a proportion of 0.1 to 10.0 wt. parts per 100 wt. parts of the binder resin so that they provide a ratio of the compound (A) to the dye (B) in the range of 1/10 to 10.0.

4,873,186

CORNEA STORAGE MEDIUM

Chung-Ho Chen, and Sumi C. Chen, both of Phoenix, Md., assignors to The Johns Hopkins University, Baltimore, Md.

Filed Sep. 2, 1987, Ser. No. 92,321

Int. Cl.[4] A01N *1/02*

U.S. Cl. 435—1 **6 Claims**

1. A method of extending a time a surgical quality isolated cornea can be stored which comprises including in the corneal storage medium containing the stored cornea, an amount of at least one compound selected from the group consisting of short chain fatty acids, ketone bodies and ketogenic amino acids capable of inhibiting lactate production by said isolated cornea sufficient to inhibit said lactate production.

4,873,187

BIFUNCTIONAL DNA-PROTEIN CONJUGATING AGENT

Floyd Taub, Rockville, Md., assignor to Digene Diagnostics, Incorporated, Silver Spring, Md.

Filed Mar. 13, 1986, Ser. No. 839,074

Int. Cl.[4] C12Q *1/68, 1/70, 1/54;* C12N *9/96*

U.S. Cl. 435—5 **23 Claims**

1. A method of detecting nucleic acid hybridization which comprises:

A. incubating (i) a sample suspected of containing a nucleic acid molecule (I) whose presence is sought to be detected with (ii) a conjugate of a single-stranded nucleic acid molecule (II) and an enzyme molecule, said conjugate comprising the following components: (a) said single-stranded nucleic acid molecule (II), (b) said enzyme molecule, and (c) a cationic detergent, wherein said cationic detergent has a positively charged group and a hydrophobic group; and wherein said enzyme of said conjugate is enzymatically active and wherein said single-stranded nucleic acid molecule (II) is complementary to said nucleic acid molecule (I); and

B. detecting said nucleic acid hybridization by detecting any enzyme molecule of said conjugate (ii) wherein the single-stranded nucleic acid molecule (II) of said conjugate has hybridized with said nucleic acid molecule (I).

4,873,188

METHOD, MONOCLONAL ANTIBODY, AND MONOCLONAL ANTIBODY FRAGMENTS FOR DETECTING HUMAN NON-SMALL CELL LUNG CARCINOMAS AND CELL LINE FOR PRODUCING SUCH ANTIBODIES

Ingegerd Hellström; Joseph P. Brown; Karl E. Hellström; Diane Horn, and Peter Linsley, all of Seattle, Wash., assignors to Oncogen, Seattle, Wash.

Filed May 28, 1985, Ser. No. 738,612

Int. Cl.[4] G01N *33/574, 33/577*

U.S. Cl. 435—7 **17 Claims**

1. A method for determining the presence of a malignant condition in the lung of a subject, which comprises examining tissue from said subject, for the presence of a carbohydrate antigen which is Le^y antigen or an antigen having the characteristics of Le^y antigen.

4,873,189

MONOCLONAL ANTIBODIES TO BLUETONGUE VIRUS ANTIGEN

Michael M. Jochim, Arvada, and Suzanne C. Jones, Lakewood, both of Colo., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Jan. 12, 1984, Ser. No. 570,155

Int. Cl.[4] C12P *21/00;* C12N *15/00, 5/00;* C12Q *1/00*

U.S. Cl. 435—68 **12 Claims**

1. A hybridoma which secretes monoclonal antibody which is group-specific to bluetongue virus (BTV) antigen and does not cross react with epizootic hemorrhage disease virus (EHDV) antigen selected from the group consisting of ATCC HB 8219 and ATCC HB 8377.

4,873,190

HETERODIMERIC T LYMPHOCYTE RECEPTOR

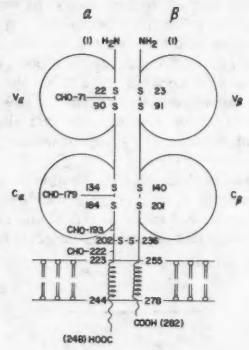
Haruo Saito, Arlington; David M. Kranz, Somerville; Herman N. Eisen, Waban, and Susumu Tonegawa, Chestnut Hill, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation-in-part of Ser. No. 620,122, Jun. 13, 1984. This application Oct. 31, 1984, Ser. No. 666,988

The portion of the term of this patent subsequent to Oct. 17, 2006, has been disclaimed.

Int. Cl.[4] C12P *21/00;* C12N *15/00;* C07K *13/00;* C07H *15/12*

U.S. Cl. 435—172.3 15 Claims



3. A cDNA sequence encoding a polypeptide component of the alpha subunit of a glycoprotein present on the surface of a T lymphocyte of mammalian origin wherein said glycoprotein is specific for at least one protein, and

wherein said glycoprotein comprises an alpha subunit and a beta subunit, said subunits including a variable region, a constant region, a region joining said variable region and said constant region, a transmembrane region and a cytoplasmic region, wherein said transmembrane region is between said constant region and said cytoplasmic region, and wherein said variable region contains a first and a second cysteine residue and said constant region contains a third and a fourth cysteine residue, wherein the region between said fourth cysteine and said transmembrane region contains a fifth cysteine, and wherein said alpha subunit and said beta subunit each comprise four sites for N-glycosylation when said glycoprotein is produced by an alloreactive clone 2C of BALB.B origin and specific for the D end of the BALB/c H-2 complex (d-haplotype).

4,873,191

GENETIC TRANSFORMATION OF ZYGOTES

Thomas E. Wagner, Athens, Ohio, and Peter C. Hoppe, Bar Harbor, Me., assignors to Ohio University, Athens, Ohio

Continuation of Ser. No. 607,754, May 4, 1984, abandoned, which is a continuation of Ser. No. 273,239, Jun. 12, 1981, abandoned. This application Aug. 18, 1986, Ser. No. 897,666

Int. Cl.[4] C12N *15/00, 1/00, 5/00*

U.S. Cl. 435—172.3 7 Claims

1. A method of obtaning a mammal characterized as having a plurality of cells containing exogenous genetic material, said material including at least one gene and a control sequence operably associated therewith, which, under predetermined conditions, express said gene under the control of said control sequence in a cell of said mammal, which comprises:

(a) introducing exogenous genetic material into a pronucleus of a mammalian zygote by microinjection, said zygote being capable of development into a mammal, said genetic material including at least one gene and a control sequence operably associated therewith, thereby obtaining a genetically transformed zygote;

(b) transplanting an embryo derived from the genetically transformed zygote into a pseudopregnant female capable of bearing the embryo to term; and

(c) allowing the embryo to develop to term;

where said gene and control sequence are selected so that the gene is not activated in such manner and degree as would prevent normal development of the embryo to term.

4,873,192

PROCESS FOR SITE SPECIFIC MUTAGENESIS WITHOUT PHENOTYPIC SELECTION

Thomas A. Kunkel, Durham, N.C., assignor to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Continuation of Ser. No. 15,316, Feb. 17, 1987, abandoned, which is a continuation of Ser. No. 623,923, Jun. 25, 1984, abandoned. This application May 18, 1988, Ser. No. 196,779

Int. Cl.[4] C12N *15/00, 7/00;* C12P *21/00, 19/34*

U.S. Cl. 435—172.3 4 Claims

1. A process for producing site-specific mutageneis in genes comprising the steps of:

(1) Separating the strands of a DNA molecule that encodes a peptide;

(2) Replacing thymine with uracil in one strand of the DNA from step (1);

(3) Preparing a single-stranded DNA fragment that contains one or more mismatched nucleotides and that will hybridize to the uracil-containing DNA strand prepared in step (2);

(4) Hybridizing the uracil-containing strand prepared in step (2) to the strand of DNA fragment prepared in step (3) to form a heteroduplex;

(5) Converting the heteroduplex formed in step (4) to a full-length double-stranded DNA molecule; and

(6) Hydrolyzing the uracil-containing strand by in vitro treatment with uracil-glycosylase or by inserting the product of step (5) into a ung+ *E. coli.*

4,873,193

METHOD AND APPARATUS FOR THE COLLECTION AND PRESERVATION OF FLUID BIOLOGICAL EVIDENCE

Richard E. Jensen, St. Peter; Donald H. Nichols, Roseville, and D. Gary Hemphill, Wayzata, all of Minn., assignors to Forensic Applications Corporation, Minneapolis, Minn.

Filed Aug. 26, 1987, Ser. No. 89,586

Int. Cl.[4] G01N *1/00;* B65D *21/00*

U.S. Cl. 436—176 20 Claims

1. An apparatus for collecting and preserving a sample of a biological fluid for evidentiary purposes, said apparatus comprising:

a vial, said vial defining a first aperture and a first receptacle region for containing a sample;

a first lid, said first lid being engagingly mountable on said vial adjacent said first aperture to form a removable closure over said first aperture;

sealing means for producing a removable fluid tight seal between said vial and said first lid when said first lid is engagingly mounted on said vial;

a tamper evident wrapper means, said wrapper means initially encasing said vial, said first lid, and said sealing means with said first lid being inverted upon said vial such that said sealing means does not form said fluid tight seal between said vial and said first lid,

an outer container for initially receiving said vial and said first lid, said outer container defining a second aperture through which said vial and said lid and said sealing means encased in said tamper evident wrapper means may be inserted, and a second receptacle region which may re-

ceive and contain said vial, said lid, said sealing means, and said tamper evident wrapper means; and

a second lid, said second lid being engagingly mountable on said outer container adjacent said second aperture to form a removable closure over said second aperture, whereby a person collecting the sample may remove the vial, the first

lid, and the sealing means from the tamper evident wrapper means, place the sample within the first receptacle of the vial, engagingly mount the first lid on the vial such that the sealing means forms the fluid tight seal therebetween, and then return the vial and lid to the second receptacle region within the outer container.

4,873,194

PROCESS FOR PREPARING ENZYME PREPARATION

Norio Sawamura, Hashimoto; Takaharu Matsuo, Sennan; Kazunobu Tsumura, Sakai, and Yoshitaka Ebihara, Yao, all of Japan, assignors to Fuji Oil Company, Limited, Osaka, Japan

Filed May 29, 1987, Ser. No. 56,409

Int. Cl.[4] C12N *9/20*

U.S. Cl. 435—198 **3 Claims**

1. A process for preparing an enzyme preparation which comprises drying a hydrated substance having lipase-activity while contacting the hydrated substance with a fatty acid derivative selected from the group consisting of fatty acids, lower alcohol esters of fatty acids, surfactants and triglycerides,

the amount of said fatty acid derivative being 0.02 to 10% by weight based on the weight of said hydrated substance calculated as a total amount of the solids contained therein.

4,873,195

BLOCK-FORMED BASIDIOMYCETE AND A METHOD OF CULTIVATION FOR THE SAME

Yoshimasa Kubo; Masao Hondo, both of Suzaka; Masashi Tanaka, and Akihiko Asahi, both of Nagano, all of Japan, assignors to Kabushiki Kaisha Akita, Takayama, Japan

Filed May 18, 1988, Ser. No. 195,274

Int. Cl.[4] C12N *1/14*

U.S. Cl. 435—254 **20 Claims**

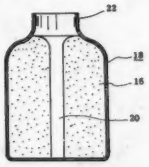
1. A method of cultivating a block-formed basidiomycete, comprising:

(a) cultivating seed-spawns of a basidiomycete in a container;

(b) removing a portion of said seed-spawns from said container to form a bed;

(c) producing projected primordia as spawn tissues on said bed by propagating said spawns in a dark cultivation room; and

(d) agglutinating said primordia by plumping said primordia,



the primordia being formed by suppressing the production of fruit bodies of a basidiomycete under atmospheric conditions of a relative shortage of oxygen and an excess of carbon dioxide gas.

4,873,196

PROTOPLASTS OF TEMPERATURE-SENSITIVE STRAINS OF NEUROSPORA CRASSA OS-1

Claude P. Selitrennikoff, Golden, Colo., assignor to University Patents, Inc., Westport, Conn.

Continuation of Ser. No. 382,847, May 27, 1982, abandoned. This application Aug. 30, 1985, Ser. No. 771,389

Int. Cl.[4] C12N *1/14*; C12R *1/645*

U.S. Cl. 435—254 **14 Claims**

1. A temperature-sensitive protoplast of a temperature-sensitive variant of *Neurospora crassa* os-1, characterized in that said protoplast will propagate as protoplasts when grown in a suitable culture medium containing sorbose and Polyoxin at non-permissive temperatures, but transfer of these protoplasts to a medium containing sorbitol and incubation at permissive temperatures will result in the regeneration of whole cells bearing morphologically normal cell wall.

4,873,197

QUICK COLOR TEST TO DETECT LEAD RELEASE FROM GLAZED CERAMIC AND ENAMELED METAL WARE

John H. Gould, Silver Spring, Md., assignor to The United States of America as represented by the Scretary of the Department of Health, Bethesda, Md.

Filed Oct. 28, 1988, Ser. No. 264,041

Int. Cl.[4] G01N *33/20*

U.S. Cl. 436—77 **10 Claims**

1. A method for determining the presence of excessive amounts of lead on an area of glazed ceramic or enameld metal ware, which comprises:

extracting lead from said area of said ware by contacting said area with a filter paper containing a solution of a material selected from the group consisting of formic acid, citric acid, and mixtures thereof;

spotting said filter paper with a chromogen; and

detecting a change in color of said filter paper.

4,873,198

METHOD OF MAKING PHOTOVOLTAIC CELL WITH CHLORIDE DIP

Peter V. Meyers, Green Lane, Pa.; Chung-Heng Liu, Princeton Junction, N.J., and Timothy J. Frey, Schwenksville, Pa., assignors to Ametek, Inc., Paolli, Pa.

Division of Ser. No. 118,610, Nov. 9, 1987, abandoned, which is a continuation of Ser. No. 922,122, Oct. 21, 1986, Pat. No. 4,710,589. This application Jun. 2, 1988, Ser. No. 203,610

Int. Cl.[4] H01L *31/18*

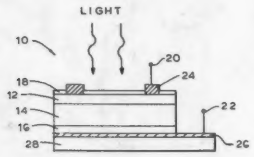
U.S. Cl. 437—5 **37 Claims**

1. In a method of making a multi-layer photovoltaic cell

containing a heat-treated layer comprised of CdTe or ternary compounds thereof, the sequential steps of:

(A) forming the CdTe layer,

(B) applying a chloride solution thereto,



(C) heat-treating the CdTe layer with the chloride solution thereon, and

(D) etching the heat-treated surface of the CdTe layer and then applying a further layer thereto.

4,873,199

METHOD OF MAKING BIPOLAR INTEGRATED CIRCUITS

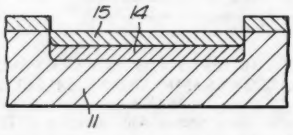
Rowland G. Hunt, Ipswich, Great Britain, assignor to STC PLC, London, England

Continuation of Ser. No. 23,223, Mar. 9, 1987, abandoned. This application Sep. 23, 1988, Ser. No. 249,205

Claims priority, application United Kingdom, Mar. 26, 1986, 8607593

Int. Cl.[4] H01L *21/265*

U.S. Cl. 437—31 **5 Claims**



1. A method of fabricating a bipolar polysilicon emitter transistor in a single crystal substrate, the method including defining a doped well in the substrate by implanting phosphorus dopant ions at a dose of about $7.7\times10^{12}/cm^2$ into the well region at an energy of about 100 KeV and heating the substrate to drive in the dopant, implanting boron ions at a dose of about $2.8\times10^{12}/cm^2$ and at an energy of about 160 KeV and further heating the substrate to drive in the boron dopant and to effect compensation between the two dopants whereby the peak net dopant concentration is disposed at a depth of 2 to 5 microns below the substrate surface, implanting boron ions into the well thus forming to define a p-type base layer depositing a body of undoped polysilicon on a selected area of the base layer so as to define a polysilicon emitter, providing an oxide coating on the polysilicon emitter body, implanting boron ions into the base layer to define p+-type base contact regions, and oxide layer on the emitter body providing a mask whereby the base contact regions are aligned with the emitter body and whereby implantation into the emitter body is inhibited, implanting an n-type dopant into the well to provide a collector contact, heating the substrate to drive in the implanted base contact regions and collector contact, and applying metal contacts to the collector contact, the base contact regions and the polysilicon emitter body.

4,873,200

METHOD OF FABRICATING A BIPOLAR TRANSISTOR

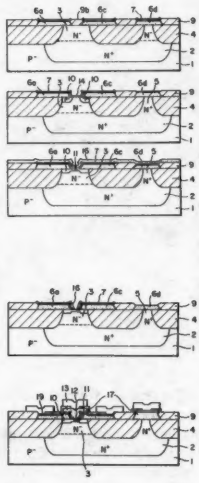
Akira Kawakatsu, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Apr. 20, 1988, Ser. No. 183,883

Claims priority, application Japan, Apr. 20, 1987, 62-95358

Int. Cl.[4] H01L *21/265*

U.S. Cl. 437—31 **9 Claims**



1. A method of fabricating a bipolar transistor on a semiconductor substrate, comprising steps of:

forming a first polycrystalline silicon layer over a main surface of a silicon substrate having a first conductivity type land region;

forming an antioxidizing film in selected areas over the surface of the first polycrystalline silicon layer;

selectively oxidizing portions of the first polycrystalline silicon layer using the antioxidizing film as a mask;

introducing a second conductivity type impurity through the antioxidizing film into at least some unoxidized portions of the first polycrystalline silicon layer;

forming an opening by selectively removing the oxidized first polycrystalline silicon layer to expose a part of the land region;

forming a thin oxide film over the surface of the exposed land region and a side surface of the opening;

forming a first region of the second conductivity type in the unexposed land region;

forming a second region of the second conductivity type disposed on a side of the first region by introducing a second conductivity type impurity through the thin oxide film into the land region;

forming a first oxide film through a CVD process over an entire surface of the structure obtained by said steps;

forming a second polycrystalline silicon layer over an entire surface of the oxide film;

selectively removing the second polycrystalline silicon layer through an anisotropic etching process so as to be remained the second polycrystalline silicon layer only on the side surface of the opening;

etching the exposed first oxide film and thin oxide film to expose the second region;

selectively forming a third polycrystalline silicon layer dopsed the first conductivity type impurity at least on the exposed second region;

diffusing the first conductivity type impurity from the third polycrystalline silicon layer into the second region to form a third region of the first conductivity type in the second region; and

forming a metal silicide film at least over the surface of a portion of the first polycrystalline silicon layer.

4,873,201

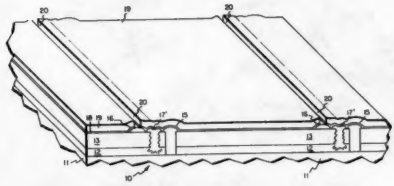
METHOD FOR FABRICATING AN INTERCONNECTED ARRAY OF SEMICONDUCTOR DEVICES

Derrick P. Grimmer, White Bear Lake; Kenneth R. Paulson, North St. Paul, and James R. Gilbert, St. Paul, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 10, 1987, Ser. No. 131,416

Int. Cl.[4] H01L *31/18*

U.S. Cl. 437—51 **48 Claims**



1. A method for fabricating an interconnected array of semiconductor devices based on an electrical insulating substrate initially having on a surface thereof a conductive support layer which supports a semiconductor material layer thereon having first and second major surfaces with said support layer being in electrical contact with said semiconductor material layer second major surface, said method comprising:

dividing said semiconductor material layer and said support layer into a plurality of semiconductor devices by removing selected commonly located portions of said semiconductor material layer and said support layer to thereby form separating spaces between adjacent said semiconductor devices each of which devices comprises a corresponding portion of said support layer and a corresponding portion of said semiconductor material layer having corresponding portions of said first and second major surfaces;

forming at said semiconductor material layer first major surface portions an electrical insulating intervening material in each said separating space extending through said semiconductor layer and said support layer; and

forming in each said semiconductor device a penetrating terminal extending through said semiconductor material layer portion therein from said first major surface portion thereof to be in electrical contact with its corresponding said support layer portion, each said penetrating terminal being formed from a location spaced apart in said semiconductor material layer first major surface from said separating spaces with said penetrating terminal on each said semiconductor device being electrically interconnected to that said semiconductor material layer first major surface portion provided in an adjacent said semiconductor device.

4,873,202

SOLID STATE RELAY AND METHOD OF MANUFACTURING THE SAME

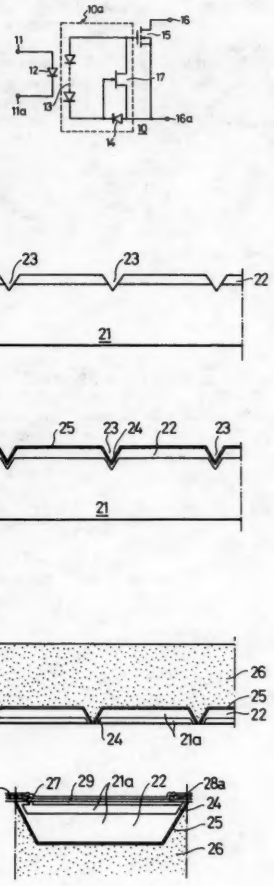
Sigeo Akiyama, Neyagawa, Japan, assignor to Matsushita Electric Works, Ltd., Osaka, Japan

Division of Ser. No. 26,994, Mar. 10, 1987, Pat. No. 4,804,866. This application Nov. 7, 1988, Ser. No. 268,215

Claims priority, application Japan, Mar. 24, 1986, 61-68112; Jun. 16, 1986, 61-139911

Int. Cl.[4] H01L *29/78*

U.S. Cl. 437—62 **5 Claims**



1. A method of manufacturing a solid state relay, the method comprising the steps of forming a first high impurity concentration layer on one side of a low impurity concentration single crystal substrate layer; forming a plurality of grooves penetrating through said first high impurity concentration layer into said single crystal substrate; forming a second high impurity concentration layer over the entire surface of said first high impurity concentration layer and said grooves; coating said second high impurity concentration layer with an insulating

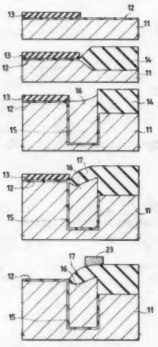
film over its entire surface; forming a carrier layer on said insulating film; preparing a dielectric-isolated substrate by abrading said low impurity concentration single crystal substrate layer from a reverse side thereof, so that the first and second high impurity concentration layers will appear in the form of a plurality of islands mutually isolated by said carrier layer filling said plurality of grooves and electrically isolated by said insulating film with said single crystal substrate layer appearing between respective said islands; and forming with said first and second high impurity concentration layers of the respective islands a plurality of diodes of a photovoltaic diode array for optical coupling to a light emitting element and for generating a photovoltaic output to be applied across gate and substrate electrodes of an output MOS FET, an impedance element being connected to both end terminals of said photovoltaic diode array and to said gate and substrate electrode of said MOS FET, and a normally ON driving transistor to be biased to be in a high impedance state by a voltage drop across said impedance element due to a current flowing through the impedance element.

4,873,203

METHOD FOR FORMATION OF INSULATION FILM ON SILICON BURIED IN TRENCH

Toru Kaga, Urawa; Shinichiro Kimura, Hachiouji; Tokuo Kure, Kokubunji; Yoshifumi Kawamoto, Kanagawa, and Hideo Sunami, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 19, 1988, Ser. No. 221,351
Claims priority, application Japan, Jul. 27, 1987, 62-185481
Int. Cl.[4] H01L *21/76*
U.S. Cl. 437—67 **20 Claims**



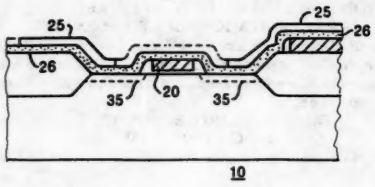
1. A method for forming an insulation film on silicon buried in a trench, which comprises the steps of (i) forming a first mask composed of a first Si_3N_4 layer on a silicon substrate, (ii) forming a field oxide film by using the first mask composed of the first Si_3N_4 layer, (iii)forming a trench in the silicon substrate, (iv) burying polycrystalline silicon in the trench, and (v) oxidizing the surface of the polycrystalline silicon in the state where no Si_3N_4, other than the first Si_3N_4 layer of the first mask, is present on the silicon substrate adjacent the trench.

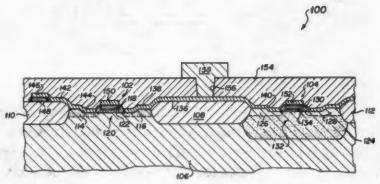
4,873,204

METHOD FOR MAKING SILICIDE INTERCONNECTION STRUCTURES FOR INTEGRATED CIRCUIT DEVICES

Siu-Weng S. Wong, Ithaca, N.Y.; Devereaux C. Chen, San Jose, and Kuang-Yi Chiu, Los Altos Hills, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 922,608, Oct. 24, 1986, abandoned, which is a continuation-in-part of Ser. No. 621,285, Jun. 15, 1984, abandoned. This application Nov. 8, 1988, Ser. No. 270,415
Int. Cl.[4] H01L *21/283*
U.S. Cl. 437—200 **14 Claims**





1. A method of forming an electrically conducting path between a contact region and a junction region on an integrated circuit, the method comprising the steps of:

forming a layer of a refractory metal over and between a contact region and a junction region of an integrated circuit;

forming a layer of amorphous silicon over said layer of refractory metal;

patterning said amorphous silicon to form a strip the strip extending over and between the contact region and the junction region but stopping short of a gate region adjacent the junction region;

heating the integrated circuit to cause that portion of the metal which is covered by the strip of amorphous silicon to react therewith and to cause that portion of the metal which overlies the junction region adjacent the gate region to react with a surface part of the junction region to form a strip of electrically conducting silicide which is in electrical contact with the junction region adjacent the gate and which extends between the junction region and the contact region; and

removing the remainder of said refractory metal which was not converted to silicide by said heating step.

4,873,205

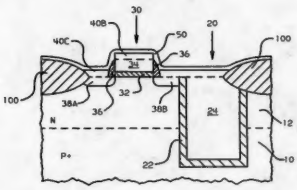
METHOD FOR PROVIDING SILICIDE BRIDGE CONTACT BETWEEN SILICON REGIONS SEPARATED BY A THIN DIELECTRIC

Dale L. Critchlow, Burlington; John K. DeBrosse, Essex Junction; Rick L. Mohler, Williston; Wendell P. Noble, Jr., Milton, and Paul C. Parries, Essex Junction, all of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 135,953, Dec. 21, 1987, abandoned. This application Sep. 1, 1988, Ser. No. 240,421

Int. Cl.[4] H01L *21/205, 21/283, 21/314*

U.S. Cl. 437—200 **17 Claims**



1. A process for forming a bridge contact between first silicon regions separated by a narrow insulator gap without forming a contact between second silicon regions separated by insulator gaps that are wider than the narrow insulator gap, comprising the steps of:

providing a substrate having a plurality of first and second exposed silicon regions on an exposed surface thereof separated by a plurality of insulator regions, said first regions being separated by narrow insulator gaps and said second regions being separated by other insulator gaps appreciably wider than said narrow insulator gaps, at least some of said first and second regions comprising shallow diffusion regions;

growing undoped silicon regions over said plurality of first and second regions by exposure to a deposition gas comprised of a silicon component and an etchant component, said silicon component and said etchant component being present at a ratio sufficient to allow said silicon to grow over said narrow insulator gaps without allowing said silicon to grow over said other insulator gaps, said undoped silicon regions being grown under conditions that do not appreciably vary dopant profiles of said shallow diffusion regions;

depositing a refractory metal on said substrate, said refractory meal being of a thickness commensurate with that of said grown silicon regions;

sintering said substrate to form silicide regions over said first and second regions as well as over said narrow insulator gaps without forming a silicide over said other insulator gaps; and

removing unreacted portions of said refractory metal without appreciably etching said silicide regions.

4,873,206

DARK, NEUTRAL, GRAY, NICKEL-FREE GLASS COMPOSITION

James V. Jones, Cumberland, Md., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jul. 5, 1988, Ser. No. 215,191

Int. Cl.[4] C03C *3/087*

U.S. Cl. 501—71 **12 Claims**

1. A neutral gray colored glass composition having a base glass composition comprising:

SiO_2	68–75 percent by weight

-continued

Na_2O	10–18
CaO	5–15
MgO	0–5
Al_2O_3	0–5
K_2O	0–5

and traces of melting and refining aids, if any, and colorants consisting essentially of:

Fe_2O_3 (total iron)	0.6–1.0 percent by weight
Se	0.005–0.02
CoO	0.01–0.02

at least 15 percent of the iron being in the ferrous state, the glass having a luminous transmittance of no more than 20 percent and total solar energy transmittance less than 40 percent at a thickness of 0.219 inch (5.56 millimeters).

4,873,207

CERAMIC AGGREGATE FOR ROADWAY COMPOSITION AND METHOD OF PRODUCING SAME

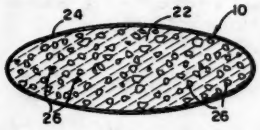
Fred Keller, Jr., 1410 Winston Cir., Bethlehem, Pa. 18017

Continuation-in-part of Ser. No. 143,587, Jan. 13, 1988, Pat. No. 4,780,433, which is a continuation-in-part of Ser. No. 924,891, Oct. 30, 1986, Pat. No. 4,740,486. This application May 3, 1988, Ser. No. 189,665

The portion of the term of this patent subsequent to Apr. 26, 2005, has been disclaimed.

Int. Cl.[4] C04B *20/00, 33/22, 38/06*

U.S. Cl. 501—80 **9 Claims**



1. A ceramic aggregate for concrete constructions comprising a mixture of clay and dried organic garbage in the ratio of about three parts by volume of organic garbage to about one part by volume clay, said mixture shaped into pellets and fired at a temperature in excess of the vitrification point of said clay.

5. In a cement based composition for building structures with increased hardness, the improvement comprising the addition to about one part by volume dry cement and about two parts granular sand or grog:

about three parts ceramic aggregate pellets, said aggregate pellets being formed from a premix of vitreous clay and processed shredded and dried organic garbage mulch in the ratio of one part clay to three parts organic garbage mulch by volume, the pellets being fired at a temperature higher than the vitrification point of said vitreous clay.

7. A method for producing a ceramic composition to make cement for roadways comprising:

(a) providing a dried organic mulch made from processed shredded organic garbage;

(b) mixing vitreous clay with said organic mulch, said clay having a fixing temperature of from about cone 3 (2000 degrees F.) to about cone 14 (2400 degrees F.);

(c) shaping said mixture of step (b) into pellets, each said pellet being generally elliptical with a rounded top surface, rounded ends, and a generally flat bottom surface, said ends having a height one half as great as the height of said pellet's longitudinal midpoint;

(d) firing said pellets at a temperature at least 100 degrees F.

above said clay's vitrification point to cause said pellet surface to melt;

(e) mixing dry cement, grog, and said pellets in the general ratio of one part cement to two parts grog to three parts pellets; and

(f) mixing the mixture of step (e) with water to form concrete.

4,873,208

HOLDER FOR SEALING MEMBER

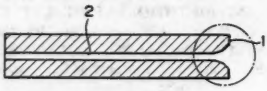
Mitsuhiro Nagata, Yokohama; Tadashi Hayashi, Yokosuka; Yoshinobu Hashimoto, Sakai, and Kiyoshi Nakamura, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 849,728, Apr. 9, 1986, abandoned. This application Oct. 19, 1987, Ser. No. 109,399

Claims priority, application Japan, Jun. 10, 1985, 60-124221

Int. Cl.[4] C04B *35/52, 35/58*

U.S. Cl. 501—89 **10 Claims**



1. A holder for a sealing member, in which at least a portion of said holder which comes into contact with said member comprises a sintered body comprising as a main component a non-oxide ceramic of silicon nitride, aluminum nitride, sialon or silicon carbide finished to a grinding degree of less that 4 S wherein S indicates a surface roughness in accordance with Japanese Industrial Standard B 0601.

4,873,209

INSULATING LIGHTWEIGHT REFRACTORY MATERIALS

Bohdan Gnyra, Kingston, Canada, assignor to Alcan International Limited, Montreal, Canada

Filed Jun. 17, 1988, Ser. No. 208,255

Claims priority, application Canada, Jun. 26, 1987, 540710

Int. Cl.[4] C04B *35/82*

U.S. Cl. 501—95 **27 Claims**

1. A settable composition, which comprises a mixture of:

ceramic fibers,

natural wollastonite powder, and

aqueous colloidal silica having a solids content of about 5–25% by wt.;

wherein the weight ratio of the ceramic fibres to the wollastonite powder is 0.8–1.2:1.5–2.5, respectively, and wherein the amount of said aqueous colloidal silica relative to the amount of said wollastonite powder is about 1–1.4 ml per gram.

4,873,210

SIALON CONTAINING HIGH CONTENT OF ALPHA PRIME PHASE

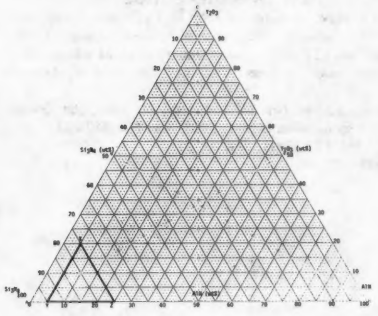
Martin Y. Hsieh, Palo Alto, Calif., assignor to GTE Products Corporation, Stamford, Conn.

Filed Dec. 2, 1987, Ser. No. 127,846

Int. Cl.[4] C04B *35/58*

U.S. Cl. 501—98 **7 Claims**

1. A pressureless sintered silicon aluminum oxynitride article having high density and high hardness and having a composition which contains about 100 weight percent of alpha prime



phase sialon and is located in Triangle XYZ of the quasiternary system Si_3N_4—AlN—Y_2O_3 shown in FIG. 1.

4,873,211

CRACKING CATALYST AND PROCESS

Darrell W. Walker, Media, Pa., and A. M. Schaffer, Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 69,337, Jul. 2, 1987, Pat. No. 4,765,884. This application May 13, 1988, Ser. No. 193,863

Int. Cl.[4] B01J *27/18, 27/82, 29/06*

U.S. Cl. 502—64 **11 Claims**

1. A composition of matter, effective as a cracking catalyst composition, comprising:

(a) zeolite and

(b) a matrix material, in which said zeolite is embedded, consisting essentially of aluminum phosphate.

4,873,212

NITROGEN-CONTAINING BIDENTATE COMPOUND IMMOBILIZED ON A SOLID INORGANIC CARRIER

Johan Stapersma, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

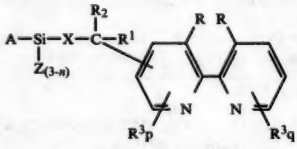
Filed Mar. 7, 1988, Ser. No. 165,054

Claims priority, application United Kingdom, Mar. 25, 1987, 8707131

Int. Cl.[4] B01J *31/02;* **C07F** *7/18, 5/06*

U.S. Cl. 502—158 **6 Claims**

1. A catalyst composition comprising nitrogen-containing bidentate compound immobilized on a solid inorganic carrier having the formula



wherein A forms part of a solid inorganic nucleus of an oxide of silicium or of aluminium, Si is silicon, Z is an alkyl, aryl, alkoxy or aryloxy group of up to 10 carbon atoms; n is an integer 1, 2, or 3; and when n is 2 or 3 the remaining Si-bonds are connected with the nucleus A; R^1 and R^2 independently are hydrogen, an alkyl or cycloalkyl group of up to 7 carbon atoms or a benzyl group; or both R^1 and R^2 together form a group $—(CH_2)_a—$ wherein a is an integer of from 2 to 6; each R is hydrogen or both R's together form the group —CH=CH—;

each R^3 individually is an alky lof 1 to 6 carbon atoms, phenyl, alkoxy of 1 to 6 carbon atoms, phenoxy, alkylthio of 1 to 6 carbon atoms, or phenylthio group and p and q are integers of from 0 to 2 and of from 0 to 3, respectively; the

group is linked to a carbon atom of the heterocyclic aromatic ring which occupies the ortho- or para-position with respect to the nitrogen atom in said heterocyclic ring; and —X— is a bivalent organic radical.

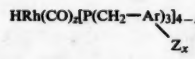
4,873,213

LOW PRESSURE RHODIUM CATALYZED HYDROFORMYLATION OF OLEFINS

Thomas A. Puckette, 306 Jamie Ct., and Thomas J. Devon, 109 Katy Dr., both of Longview, Tex. 75601

Filed Aug. 12, 1988, Ser. No. 231,564
Int. Cl.[4] B01J *31/18*
U.S. Cl. 502—161 **8 Claims**

1. A catalyst composition comprising a mixture of rhodium components having the structure:



wherein

Ar is an aromatic ring having 6–14 carbon atoms;

each Z is independently:

a C_1 up to C_{12} alkyl radical;

a C_6 up to C_{12} aryl radical;

a C_7 up to C_{12} alkaryl or aralkyl radical; halogen, excluding Cl, Br or I in the ortho position;

—OR or —CO_2R, wherein R is a C_1 up to C_{12} alkyl radical, a C_6 up to C_{12} aryl radical, or a C_7 up to C_{12} alkaryl or aralkyl radical;

wherein x is a whole number which varies in the range of 0 up to 4 when Ar is phenyl, 0 up to 6 when Ar is naphthyl and 0 up to 8 when Ar is phenanthryl or anthracenyl;

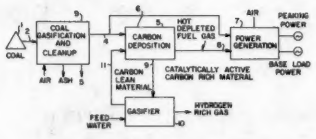
and wherein z is a whole number selected from 2 and 3.

4,873,214

CARBONACEOUS MATERIAL FOR PRODUCTION OF HYDROGEN FROM LOW HEATING VALUE FUEL GASES

Elias P. Koutsoukos, Los Angeles, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Continuation of Ser. No. 685,882, Dec. 24, 1984, abandoned. This application Jun. 30, 1987, Ser. No. 70,627
Int. Cl.[4] B01J *21/18*; C01B *31/02, 3/02*; C10K *3/04*
U.S. Cl. 502—185 **4 Claims**



1. A fibrous carbon-enriched carbonaceous material for use in a continuous steam gasification process for producing a hydrogen-rich gas stream from a low heating value fuel gas, the fibrous carbon-enriched carbonaceous material having been produced by carbon deposition from a low heating value fuel gas comprising carbon monoxide at a temperature above about 350° C. onto a carbon lean material comprising a metal component, the fibrous carbon-enriched carbonaceous material comprising:

about 55 to about 98 percent by weight carbon, about 1 to about 44 percent by weight metal component, and about 0.1 to about 1 percent by weight hydrogen; and including a major phase and a minor phase,

(i) the major phase comprising from about 95 to about 99.9 percent by weight carbon, about 0.1 to about 1 percent by weight hydrogen, and the balance being the metal component; and

(ii) the minor phase being nodules which are dispersed throughout the major phase and are intimately associated with, and at least partly bonded to the carbon in the major phase, the minor phase comprising carbon and at least about 50 percent by weight metal component,

wherein the metal component comprises from about 75 to about 95 percent by weight cobalt, and an effective amount of iron in an amount of from about 5 to about 15 percent by weight and an effective amount of chromium in an amount of from about 1 to about 10 percent by weight for suppressing the production of methane and enhancing the production of hydrogen, so that the carbon-enriched carbonaceous material is capable of producing a gas stream that consists primarily of hydrogen and not more than about 5 mole percent methane on a dry basis.

4,873,215

CATALYST FOR AMMOXIDATION OF PARAFFINS

James F. Brazdil, Mayfield Village, and Andrew T. Guttmann, Maple Heights, both of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Division of Ser. No. 919,105, Oct. 15, 1986, abandoned. This application May 13, 1987, Ser. No. 49,252
The portion of the term of this patent subsequent to Oct. 3, 2006, has been disclaimed.
Int. Cl.[4] B01J *27/182, 27/185, 27/188, 27/198*
U.S. Cl. 502—202 **14 Claims**

1. A complex metal oxide catalyst having ingredients and the proportions which are represented by the following empirical formula:

$$VSb_mP_nA_aD_bC_cT_fO_x$$

where

A is one or more of W, Sn, B and Ge;

D is one or more of Fe, Co, Ni, Cr, Mn, Cu, Zn, Se, Te, Pb and As;

C is one or more of an alkali metal and Tl;

T is one or more of Ca, Sr and BA;

and where m is 3–7; n is greater than zero and up to 10; a is 0.2–10; b is 0–3; c is 0–1; t is 0–1; a is equal to or less than m; b is equal to or less than m; n is equal to or less than m; and wherein the antimony has an average valency higher than +3, the vanadium has an average valency lower than +5, wherein A includes at least 0.2 atoms of W and the catalyst is essentially free of Mo and is on an inorganic support material selected from silica-alumina and alumina having 20 to 100 weight percent alumina.

4,873,216

LANTHANA-ALUMINA-ALUMINUM PHOSPHATE CATALYST COMPOSITION

Robert P. L. Absil, Mantua; Philip J. Angevine, West Deptford; Arthur W. Chester, Cherry Hill, and Garry W. Kirker, Washington Township, Gloucester County, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 50,446, May 18, 1987, Pat. No. 4,810,361.
This application Dec. 13, 1988, Ser. No. 283,778
The portion of the term of this patent subsequent to Aug. 30, 2005, has been disclaimed.
Int. Cl.[4] B01J *21/04, 23/10, 27/18, 32/00*
U.S. Cl. 502—211 13 Claims

1. A catalyst composition comprising catalytic component selected from the group consisting of metals of groups IIIB, IVB, VB, VIB, VIIB and VIII of the Periodic Table of Elements, copper, zinc and combinations thereof, and a catalyst support comprising an amorphous combination of lanthana, alumina and aluminum phosphate in the absence of a hydrocarbon-containing feedstream.

4,873,217

CATALYST FOR OXIDATION OF OLEFIN OR TERTIARY ALCOHOL AND PROCESS FOR PRODUCTION THEREOF

Tatsuya Kawajiri; Hideo Onodera; Shinichi Uchida, all of Himeji; Yukio Aoki, Taishi, and Masahiro Wada, Nishinomiya, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan

Filed Feb. 17, 1988, Ser. No. 156,669
Claims priority, application Japan, Feb. 17, 1987, 62-32354; Jun. 18, 1987, 62-150112
Int. Cl.[4] B01J *23/78, 23/84, 23/88*
U.S. Cl. 502—311 15 Claims

1. A catalyst useful for producing, by catalytic gas phase oxidation of a C_3–C_5 olefin or tertiary alcohol, the corresponding unsaturated aldehyde and unsaturated carboxylic acid, said catalyst being obtained by forming particles of an unfired material powder comprising molybdenum, iron and bismuth in a centrifugal flow coating device, and then firing the particles, said catalyst having a specific surface area in the range of rom 1 to 20 m^2/gr, a pore volume in the range of from 0.1 to 1.0 cc/gr and a pore diameter distribution in which the pore diameters are collectively distributed in the range of each of from 1 to 10 microns and from 0.1 to less than 1 micron.

4,873,218

LOW DENSITY, RESORCINOL-FORMALDEHYDE AEROGELS

Richard W. Pekala, Pleasant Hill, Calif., assignor to The United States Department of Energy, Wash.

Filed May 26, 1988, Ser. No. 199,404
Int. Cl.[4] B01J *20/02;* C08J *9/28*
U.S. Cl. 502—418 15 Claims

1. A process for the synthesis of a low density, organic aerogel of ultra-fine pore size, said process comprising the steps of:

mixing in a predetermined ratio a polyhydroxy benzene and formaldehyde in the presence of a base catalyst;

heating the mixture to a predetermined temperature for a sufficiently long period of time to form a stable gel;

washing the gel in a suitable organic solvent to exchange the aqueous solvent for the organic solvent;

critical point drying the gel; and

characterizing the gel.

4,873,219

DESENSITIZABLE SELF-CONTAINED RECORD MATERIAL USEFUL FOR SECURITY DOCUMENTS AND THE LIKE

Robert W. Brown, and Donald Churchill, both of Appleton, Wis., assignors to Appleton Papers Inc., Appleton, Wis.

Filed Nov. 15, 1988, Ser. No. 271,472
Int. Cl.[4] B41M *5/16;* G03C *1/72*
U.S. Cl. 503—204 9 Claims

1. An improved self-contained pressure-sensitive record material having tamper resistance, said self-contained record material being of the type having a substrate, a coating on said substrate comprising in acidic developer material and a first set of microcapsules containing a first color former capable of expressing a first color, whrein the improvement comprises in addition a second set of microcapsules in combination with the first set of microcapsules, the second set of microcapsules containing a second color former and a photosensitive composition internal thereof which second set of microcapsules undergo a change in viscosity upon exposure to actinic radiation and which second color former is capable of expressing a color different from the color of the first color former in the first set of microcapsules, wherein the first set of microcapsules does not contain any photosensitive composition and said color formers are compounds which are not substantially decomposed by light.

4,873,220

HEAT-SENSITIVE TRANSFER MATERIAL

Seiiti Kubodera, and Takeshi Nakamine, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 25, 1988, Ser. No. 236,473
Claims priority, application Japan, Aug. 25, 1987, 62-211154
Int. Cl.[4] B41M *5/035, 5/26*
U.S. Cl. 503—227 16 Claims

1. A heat-sensitive transfer material comprising a support having provided thereon a coloring material layer containing binder and a dye represented by formula (I):

wherein

Q^1 represents an atomic group containing at least one nitrogen atom required to form a nitrogen-containing heterocyclic ring containing 5 or more members together with the carbon atoms to which Q^1 is bonded;

R^1 represents an acyl group or a sulfonyl group;

R^2 represents a hydrogen atom or an aliphatic group containing from 1 to 6 carbon atoms;

R^3 represents a hydrogen atom, a halogen atom, an alkoxy group or an aliphatic group containing from 1 to 6 carbon atoms, and may be connected to R^1, R^2 or R^4 to form a ring;

R^4 represents a halogen atom, an alkoxy group or an aliphatic group containing from 1 to 6 carbon atoms;

R^5 and R^6, which may be the same or different, each represents a hydrogen atom, an aliphatic group containing from 1 to 6 carbon atoms or an aromatic group, and R^5 and R^6 may be connected to each other to form a ring, or at least one of R^5 and R^6 may be connected to R^4 to form a ring; and

n represents an integer of from 0 to 4.

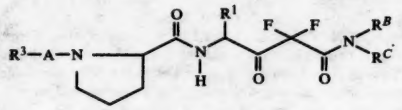
4,873,221

DIFLUORO PEPTIDE COMPOUNDS

Diane A. Trainor, Glen Mills, Pa., assignor to ICI Americas Inc., Wilmington, Del.

Filed May 19, 1987, Ser. No. 51,952
Claims priority, application United Kingdom, Jun. 5, 1986, 8613703
Int. Cl.[4] A61K *37/43;* C07K *5/08*
U.S. Cl. 514—18 4 Claims

1. A compound of formula Ib



Ib

wherein

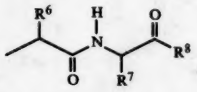
R^1 is an alkyl group containing 3 carbons;

R^3 is benzyl;

A is —OCO—;

R^C is hydrogen; and

R^B is selected from a group consisting of (a) formula IIa

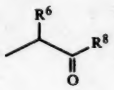


IIa

wherein

R^6 is hydroxymethyl or phenylmethyl and

R^7 is hydrogen or phenylmethyl, and (b) formula IIb



IIb

wherein

R^6 is hydrogen, phenylmethyl, 4-[(phenylmethoxy)carbonyl]butyl or 2-[(phenylmethoxy)carbonyl]ethyl; and

R^8 is methoxy, hydroxy or phenylmethoxy, or a pharmaceutically acceptable salt thereof.

4,873,222

PLACENTA-DERIVED ANTICOAGULATING SUBSTANCE

Koichi Arai, Urawa, and Hideo Yoshizaki, Sayama, both of Japan, assignors to Kowa Co, Ltd., Nagoya, Japan

Filed Oct. 2, 1987, Ser. No. 103,686

Claims priority, application Japan, Oct. 14, 1986, 61-243778

Int. Cl.[4] A61K *37/02, 35/50*

U.S. Cl. 514—21 **1 Claim**

1. A human placenta-derived anticoagulating substance having the following properties:

(1) molecular weight (SDS-polyacrylamide gel electrophoresis, reduced and non-reduced states): 73,000±2,000;

(2) isoelectric point (isoelectric column electrophoresis using an ampholyte): 6.2–6.6;

(3) stability:

(a) inactivated by a heat treatment at 50° C. for 30 minutes,

(b) stable in a pH range of 5.5–8.5 (37° C.),

(c) stable in plasma at 37° C. for 15 minutes;

(4) effects:

(a) capable of prolonging the recalcification time,

(b) capable to prolonging the prothrombin iime,

(c) capable of prolonging the activated partial thromboplastin time; and

(5) amino acid composition as determined by hydrolysis with 5.7 N HCl at 110° C.:

Amino acid	Analysis data (mol %)
Aspartic acid	11.0
Threonine	6.1*
Serine	5.8*
Glutamic acid	12.7
Proline	2.4

-continued

Amino acid	Analysis data (mol %)
Glycine	7.0
Alanine	8.9
½ Cystine	0.5
Valine	3.7**
Methionine	2.8
Isoleucine	6.2**
Leucine	10.0
Tyrosine	3.4
Phenylalanine	3.8
Histidine	1.9
Lysine	7.6
Arginine	6.3
Total	100.0

in which the unasterisked analysis data are those obtained after the 24-hour hydrolysis, the single-asterisked analysis data are those obtained by extrapolation to 0 hour, and the double-asterisked analysis data are those obtained after the 72-hour hydrolysis.

4,873,223

ZINC SALT OF FRUCTOSE-1,6-DIPHOSPHATE

Antonio B. Vinas, Barcelona, Spain, assignor to Laboratrios Vinas, S.A., Barcelona, Spain

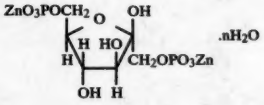
Filed Mar. 12, 1986, Ser. No. 838,996

Claims priority, application Spain, Mar. 15, 1985, 541.277

Int. Cl.[4] A61K *31/70;* **C07H** *13/00*

U.S. Cl. 514—23 **4 Claims**

3. A method of treating a male patient suffering from a condition of low zinc concentration or low fructose concentration in seminal plasma caused by gonadal dysfunction, which comprises administering to such a patient a therapeutically effective amount of a pharmaceutical composition comprising a therapeutically effective amount of the zinc salt of fructose-1,6-diphosphate having the formula



wherein n=0 to 4, in combination with a pharmacologically acceptable carrier.

4,873,224

AVERMECTIN DERIVATIVES

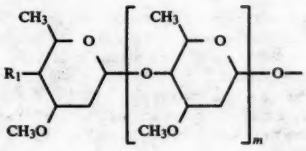
Bruce O. Linn, Bridgewater, and Helmut Mrozik, Matawan, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed May 23, 1988, Ser. No. 197,731

Int. Cl.[4] A61K *31/70;* **C07H** *17/08*

U.S. Cl. 514—30 **13 Claims**

1. A compound having the formula:



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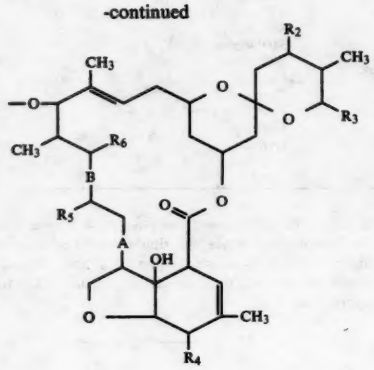
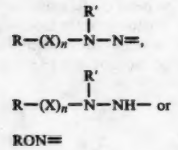


wherein
m is 0 or 1;
R_1 is



wherein
n is 0 or 1;
R is hydrogen, amino, loweralkyl, mono- or di-lower alkyl amino, methoxy-loweralkylamino, diloweralkylamino-loweralkyl, diloweralkylaminoloweralkylamino, loweralkylphenyl, loweralkyl phenylamino, loweralkoxyphenyl, loweralkoxyphenylamino, halophenyl, halophenylamino, sulfamylphenyl, sulfamyl-phenylamino, morpholinyl, N-loweralkyl piperazinyl, N-(loweralkoxy phenyl)piperazinyl, N-(halophenyl)piperazinyl, benzimidazolylamino, pyrimidinylamino, thiazolylamino, benzothiazolylamino or N-(loweralkylphenyl)piperzinyl
R′ is hydrogen or loweralkyl;
X is carbonyl or sulfonyl;
A is a double bond or an epoxide;
B is a single bond or a double bond;
R_2 is hydrogen or hydroxy,
R_3 is iso-propyl or sec-butyl,
R_4 is hydroxy or methoxy,
R_5 and R_6 are present only when B is a single bond and are independently hydrogen, hydroxy or halogen;
and the broken line indicates a single or a double bond at the 22,23-position, provided that R_2 is hydroxy only when the broken line indicates a single bond.

11. A method for the treatment of parasitic infections which comprises administering to an animal infected with parasites an effective amount of a compound of claim **1**.

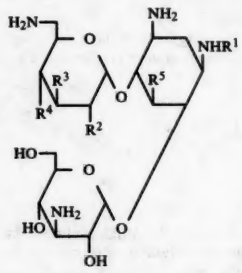
4,873,225

1-N-(4-AMINO-3-FLUORO-2-HYDROXYBUTYRYL)-KANAMYCINS

Sumio Umezawa, Tokyo; Tsutomu Tsuchiya, Yokohama; Tomio Takeuchi, Tokyo; Kazuo Umezawa, Tokyo; Yoshiaki Takahashi, Tokyo; Tetsuo Shitara, Tokyo; Yoshihiko Kobayashi, and Yasushi Takagi, both of Yokohama, all of Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Japan

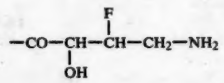
Filed Feb. 22, 1988, Ser. No. 158,628
Claims priority, application Japan, Feb. 24, 1987, 62-39033
Int. Cl.[4] A61K *31/70*; C07H *15/22*
U.S. Cl. 514—41 **13 Claims**

1. A 1-N-{(2R,3R)-4-amino-3-fluoro-2-hydroxybutyryl} kanamycin A or B derivative represented by the formula:



(I)

wherein R^1 means a (2R,3R)-4-amino-3-fluoro-2-hydroxybutyryl group of the formula:



and (a) R^2, R^3, R^4 and R^5 are each a hydroxyl group, or (b) R^4 and R^5 are each a hydroxyl group, and R^2 and R^3 are each a hydrogen atom, or (c) R^4 and R^5 are each a hydroxyl group, R^3 is a hydrogen atom, and R^2 is a fluorine atom, or (d) R^2, R^3 and R^4 are each a hydroxyl group, and R^5 is a fluorine atom, or (e) R^2 is an amino group, and R^3, R^4 and R^5 are each a hydroxyl group, or (f) R^2 is an amino group, R^3 is a hydrogen atom, and R^4 and R^5 are each a hydroxyl group, or (g) R^2 is an amino group, R^3 and R^4 are each a hydrogen atom, and R^5 is a hydroxyl group, or (h) R^2 is an amino group, R^3 and R^4 are each a hydroxyl group, and R^5 is a fluorine atom, or (i) R^2 is an amino group, R^3 is a hydrogen atom, R^4 is a hydroxyl group, and R^5 is a fluorine atom, or (j) R^2 is an amino group, R^3 and R^4 are each a hydrogen atom, and R^5 is a fluorine atom; or a pharmaceutically acceptable acid addition salt thereof.

13. A method of treating bacterial growth in an animal or human, which comprises administering a bacteriocidally effective amount of the compound of the formula (I) as defined in claim **1** or a pharmaceutically acceptable acid addition salt thereof to an animal or human infected with or susceptible to bacteria.

4,873,226

METHOD OF INHIBITING HERPETIC LESIONS BY THE USE OF PLATINUM COORDINATION COMPOUNDS

Robert C. Talroy, Oxford; Sarah G. Ward, Utica, and Parbury P. Schmidt, Rochester, all of Mich., assignors to Delta Metals, Inc., Rochester, Mich.

Division of Ser. No. 505,216, Jun. 17, 1983, Pat. No. 4,571,335.
This application Jul. 19, 1985, Ser. No. 757,062
Int. Cl.[4] A61K *31/70, 31/555, 31/28*
U.S. Cl. 514—46 5 Claims

1. A method of inhibiting herpetic lesions in a warm blooded animal comprising:

applying to the surface of the lesions of said warm blooded animal a herpes virus inhibiting amount of platinum coordination compound contained in a pharmaceutical composition in topical dosage form, the platinum coordination compound content being selected from the group of compounds consisting of cisplatin derivatives having the formula

$$cis[Pt(NH_3)_2P_xCl_y]Cl_z$$

where x is one or two, y and z being one when x is one and being zero and two when x is two, and P is cyclaradine.

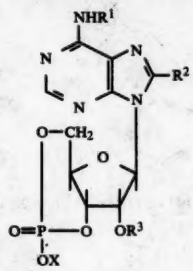
4,873,227

3',5'-CAMP DERIVATIVES FOR TREATMENT OF CERTAIN TYPES OF SKIN ULCERS

Junji Ikada, Uji, and Eiko Mano, Tokyo, both of Japan, assignors to Daiichi Seiyaku Co., Ltd., Tokyo, Japan

Filed Jun. 11, 1987, Ser. No. 60,516
Claims priority, application Japan, Jun. 16, 1986, 61-139749
Int. Cl.[4] A61K *31/70*
U.S. Cl. 514—47 12 Claims

1. A method for the treatment of a skin ulcer selected from the group consisting of a gangrene, a thermal burn, frostbite and radionecrosis, in mammals, which comprises applying to an affected area of a mammal an effective amount of an adenosine-3',5'-cyclic phosphate derivative of the formula (I):



I

wherein R^1 represents a hydrogen atom, an alkyl group of from 1 to 6 carbon atoms or an aliphatic acyl group of from 2 to 7 carbon atoms; R^2 represents a hydrogen atom, a mercapto group, an alkylthio group of from 1 to 6 carbon atoms, a benzylthio group, an amino group, a hydroxy group, a chlorine atom or a bromine atom; R^3 represents a hydrogen atom or an aliphatic acyl group of from 2 to 7 carbon atoms; with the proviso that not all of R^1, R^2 and R^3 are a hydrogen atom at the same time, and X represents a hydrogen atom or a sodium atom, to the affected portion.

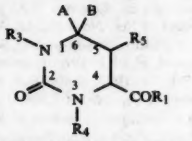
4,873,228

2-OXO-4-CARBOXY-PYRIMIDINES AND THEIR USE AS ANTI-MALARIA AND ANTI-CANCER AGENTS

Karl J. Schmalzi, Victoria; Suresh C. Sharma, Prospect, and Richard I. Christopherson, Paddington, all of Australia, assignors to The University of Melbourne, Melbourne and The University of Sydney, Sydney, both of, Australia

Filed Sep. 1, 1987, Ser. No. 91,761
Claims priority, application Australia, Sep. 2, 1986, PH7811; Sep. 22, 1986, PH8161
Int. Cl.[4] A61K *31/505;* C07D *401/06;* C08B *37/00*
U.S. Cl. 514—49 22 Claims

1. A compound of the formula (I)



(I)

wherein either (i) A and B together are =S or (ii) A is —H, and B is COR_2 or $—SR_6$; and R_1 and R_2 which may be the same or different are —OH; a di-, tri- or polypeptide group, —OR where R is saturated or unsaturated C_{1-16} alkyl, C_{1-16} alkanoyloxymethyl, or 4-alkyl-piperidinyl-alkyl, —NR'R' where each R_1 is independently selected from —H or saturated or unsaturated C_{1-16} alkyl, R_3 is H, R_4 is —H, C_{1-6} alkyl, hydroxy C_{1-16} alkyl, hydroxy C_{1-6} ether group, tetrahydrofuranyl, tetrahydropyranyl, a sugar group, hexylcarbamyl, or methylglycine-N-carbonyl, R_5 is —H, halo, or C_{1-6} alkyl; R_6 is C_{1-6} alkyl or 1-methyl 1-4-nitroimidazol-5-yl; and the dotted line represents a double bond which may be absent or present in the 4–5 position, provided that A and B shall not be =S when R_1 is OH, R_4 is —H and R_5 is —H.

18. A composition which comprises an anti-malaria effective amount, or an anti-cancer effective amount of a compound according to claim 1 together with a pharmaceutically acceptable carrier.

4,873,229

GALACTO-OLIGOSACCHARIDE CONTAINING FEED

Eiki Deya, Sayama; Shuichi Yanahira, Tsurugashimamachi; Kenkichi Abiko, and Eiichi Kikuchi, both of Kodaira, all of Japan, assignors to Snow Brand Milk Products Co., Ltd., Sapporo, Japan

Filed Dec. 8, 1986, Ser. No. 939,141
Claims priority, application Japan, Dec. 12, 1985, 60-277957
Int. Cl.[4] A61K *31/70, 31/715*
U.S. Cl. 514—54 6 Claims

1. A galacto-oligosaccharide containing stock feed which comprises a livestock feed incorporated from about 0.1 to 2% by weight of galacto-oligosaccharides being selected from the group consisting of galactosyl-lactose and digalactosyl-lactose.

4. A method of preventing scours/loose passage in livestock comprising administering thereto a livestock feed comprising 0.1 to 2% by weight of galacto-oligosaccharides relative to the livestock feed.

4,873,230

COMPOSITION FOR THE PRESERVATION OF ORGANS

Folkert O. Belzer, and James H. Southard, both of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Division of Ser. No. 784,435, Oct. 3, 1985, Pat. No. 4,798,824.
This application Jul. 27, 1988, Ser. No. 225,102
The portion of the term of this patent subsequent to Jan. 17, 2006, has been disclaimed.
Int. Cl.[4] A61K *31/715*
U.S. Cl. 514—60 2 Claims

1. A composition of matter for the preservation of organs

comprising hydroxyethyl starch having a molecular weight of from about 150,000 to about 350,000 daltons, degree of substitution of from about 0.4 to about 0.7, and being substantially free of ethylene glycol, ethylene chlorohydrin, sodium chloride and acetone.

4,873,231

DECREASING THE TOXICITY OF AN IBUPROFEN SALT

Walton J. Smith, 21 Green St., Grafton, N.H. 03240

Continuation-in-part of Ser. No. 853,542, Apr. 8, 1986, abandoned, which is a continuation-in-part of Ser. No. 469,974, Feb. 25, 1983, abandoned, which is a continuation-in-part of Ser. No. 351,962, Feb. 24, 1982, abandoned, which is a continuation-in-part of Ser. No. 161,386, Jun. 20, 1980, abandoned, which is a continuation-in-part of Ser. No. 79,119, Sep. 26, 1979, abandoned, which is a continuation-in-part of Ser. No. 923,464, Jun. 10, 1978, abandoned, which is a continuation-in-part of Ser. No. 671,939, Mar. 30, 1976, abandoned. This application Jan. 19, 1988, Ser. No. 182,284

Int. Cl.[4] A61K *31/19*

U.S. Cl. 514—557 **3 Claims**

1. A method of decreasing the toxicity of a salt of ibuprofen by combining the salt with from one to five molar excess of a bicarbonate or carbonate.

4,873,232

NOVEL USE FOR CARBAMOYL BENZOATES

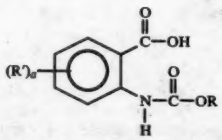
Alexander Krantz, Toronto, Canada, and John M. Young, Redwood City, Calif., assignors to Syntex, Palo Alto, Calif.

Filed Oct. 29, 1986, Ser. No. 924,246

Int. Cl.[4] A61K *31/615, 31/635*

U.S. Cl. 514—159 **30 Claims**

1. A method for treating an auto-immune disease, by administering to a subject in need thereof a compound of the formula:



(I)

or a pharmaceutically acceptable salt thereof, wherein: a is an integer of 1 or 2 and R′ is in the 6— or 4— position of the benzoic acid ring system.

R is alkyl, phenyl, or cycloalkyl having three to six carbon atoms, wherein the phenyl, or cycloalkyl ring is optionally substituted with 1 to 3 substituents independently selected from the group consisting of lower alkyl having one to four carbon atoms, lower alkoxy having one to four carbon atoms, $-N(R^1)_2$, $-NO_2$, halo, and lower alkylthio having one to four carbon atoms; and

each R′ is independently selected from the group consisting of lower alkyl having one to six carbon atoms, lower alkenyl having two to six carbon atoms, halo-lower alkyl or lower alkylthio having one to six carbon atoms, halo, and NO_2, in which

each R^1 is independently hydrogen or lower alkyl having one to four carbon atoms. each R^2 is independently lower alkyl having one to four carbon atoms.

4,873,233

17-SUBSTITUTED ANDROSTA-1,4-DIEN-3-ONE DERIVATIVES

Vittoria Villa; Enrico di Salle, and Paolo Lombardi, all of Milan, Italy, assignors to Farmitalia Carlo Erba S.p.a., Milan, Italy

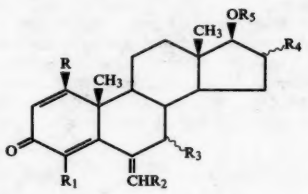
Filed Sep. 12, 1988, Ser. No. 242,855

Claims priority, application United Kingdom, Sep. 11, 1987, 8721384

Int. Cl.[4] A61K *31/56*; C07J *1/00*

U.S. Cl. 514—179 **8 Claims**

1. A compound of general formula (I)



(I)

wherein

each of R and R_3, independently, is hydrogen or C_1–C_6 alkyl;

R_1 is hydrogen, halogen or C_1–C_6 alkyl;

R_2 is hydrogen or C_1–C_6 alkyl;

R_4 is hydrogen or fluorine;

R_5 is (a) hydrogen or C_1–C_6 alkyl; (b) phenyl unsubstituted or substituted by one or two substituents independently chosen from C_1–C_6 alkyl, halogen and amino; (c) an acyl group; or (d) a hydroxy protecting group; and the pharmaceutically acceptable salts thereof.

4,873,234

ISOXAZOLOBENZOXAZEPINES

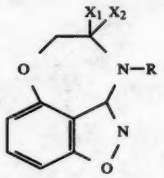
Gregory M. Shutske, Somerset, and Kevin J. Kapples, Little York, both of N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

Filed Aug. 1, 1988, Ser. No. 226,930

Int. Cl.[4] C07D *448/04*; A61K *31/55*

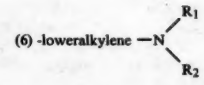
U.S. Cl. 514—211 **108 Claims**

1. An isoxazolobenzoxazepine of the formula



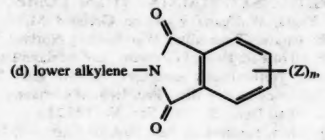
wherein X_1 is H; X_2 is H or OH; or X_1 and X_2 taken together are carbonyl oxygen or

R is (1) H, (2) loweralkyl, (3) arylloweralkyl, (4) loweralkynyl, (5) loweralkenyl,

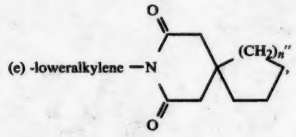


(6) -loweralkylene

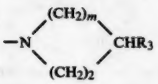
where R_1 and R_2 are independently (a) H, (b) lower alkyl, (c) arylloweralkyl, (d)



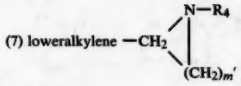
where Z is H, halogen, loweralkyl, loweralkoxy, CF_3, nitro or amino and n is an integer of 1 to 3;



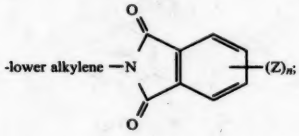
where n'' is an integer of 1 to 3; or (f) R_1 and R_2 taken together with the nitrogen atom are substituted or unsubstituted piperidino or pyrrolidino of the formula



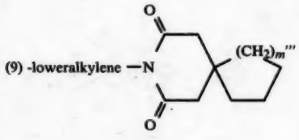
where R_3 is H, loweralkyl or aryl, and m is an integer of 1 or 2;



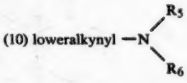
where R_4 is H or loweralkyl and m' is an integer of 3 or 4;



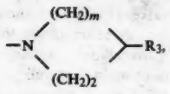
where Z and n are as previously defined;



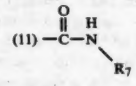
where m''' is an integer of 1,2 or 3;



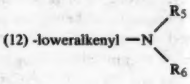
where R_5 and R_6 are independently alkyl, aryl lower alkyl or are taken together with the N atom to form a substituted or unsubstituted piperidino or pyrrolidino group of the formula



where R_3 and m are as defined above;



where R_7 is loweralkyl, aryl, or aryl loweralkyl;



where $[R_1$ and $R_2]R_5$ and R_6 are as previously defined; and the pharmaceutically acceptable acid addition salts thereof and where applicable to the geometric, and stereo isomers thereof.

4,873,235

BENZOFUSED LACTAMS AS ANTIHYPERTENSIVES

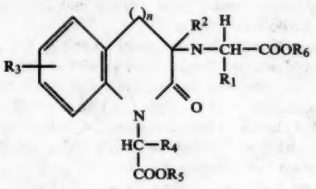
William H. Parsons, Avenel; Arthur A. Patchett, Westfield, and Eugene D. Thorsett, Fanwood, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 383,435, Jun. 1, 1982, abandoned. This application Mar. 16, 1983, Ser. No. 473,792

Int. Cl.[4] A61K *31/47*; C07D *217/24*

U.S. Cl. 514—312 **18 Claims**

1. A compound having the formula:



and pharmaceutically acceptable salts thereof wherein

n is

R_4 is hydrogen, lower alkyl, phenyl, phenyl lower alkyl, hydroxy phenyl lower alkyl, hydroxy lower alkyl, amino lower alkyl, acylamino lower alkyl, guanidino lower alkyl, imidazolyl lower alkyl, indolyl lower alkyl, mercapto lower alkyl or lower alkyl thio lower alkyl;

R_2 is hydrogen,

R_3 is H, halo, lower alkyl, cycloalkyl, or loweralkoxy,

R_1 is hydrogen; hydrocarbon of from 1 to 12 carbon atoms which include branched and unsaturated alkyl groups; cycloalkyl; substituted loweralkyl wherein the substituent can be halo, hydroxy, carboxy, carboxamido, loweralkylthio, loweralkoxy, loweralkoxycarbonyl, loweraralkoxycarbonyl, amino, loweralkylamino, lowerdialkylamino, acylamino; substituted loweralkylamino wherein the substituent can be halo, hydroxy, alkoxy or cyano; arloweralkylamino; cyclic amino; oxo, thio or ureido; aryloxy; arylthio; aralkyloxy; aralkylthio; benzofused cycloalkyl or bicycloalkyl of from 8–12 carbon atoms; aryl or heteroaryl which may be mono-, di- or trisubstituted by loweralkyl, hydroxy, loweralkoxy, halo, amino,

acylamino, loweralkylthio or aminoloweralkyl; benzofused cycloalkyl or bicycloalkyl of from 8 to 12 carbon atoms; arloweralkyl; arloweralkenyl; heteroloweralkyl and heteroloweralkenyl in which the aryl or heteroaryl rings may be mono-, di- or tri-substituted by halo, loweralkyl, hydroxy, loweralkoxy, amino, loweralkylamino, diloweralkylamino, aminoloweralkyl, acylamino, carboxy, haloloweralkyl, nitro, cyano or sulfonamido; aralkyl or heteroaralkyl which include branched loweralkyl groups; substituted aralkyl or substituted heteroaralkyl which include branched loweralkyl groups wherein the loweralkyl groups can be substituted by amino, acylamino, or hydroxyl and the aryl and heteroaryl groups can be substituted by halo, dihalo, loweralkyl, hydroxy, loweralkoxy, aryloxy, aroyl, arylthio, amino, aminoloweralkyl, loweralkanoylamino, aroylamino, lowerdialkylamino, loweralkylamino, hydroxy, hydroxyloweralkyl, trihaloloweralkyl, nitro, cyano, or sulfonamido; any of the arloweralkyl or alkenyl and heteroloweralkyl or alkenyl groups described above in which the aryl or heteroaryl ring is partially or completely hydrogenated; substituted loweralkyl having the formula $R_A^1(CH_2)_n$—Q—$(CH_2)_m$ wherein n is 0–2, m is 1–3, R_A^1 is aryl or heteroaryl optionally substituted by amino, lowerdialkylamino, loweralkylamino, hydroxy, hydroxyloweralkyl, aminoloweralkyl, trihaloloweralkyl, cyano, nitro, sulfonamido, aroyl, loweralkyl, halo, dihalo, and loweralkoxy, and Q is O, S, SO, SO_2, N-R_B^1, $CONR_C^1$, NR_C^1CO, CH=CH wherein R_B^1 is hydrogen, loweralkyl, aryl, aralkyl, loweralkanoyl, or aroyl, and R_C^1 is hydrogen, or loweralkyl;

R_5 and R_6 are independently selected from H, lower alkyl, lower alkenyl, diloweralkylamino, loweralkyl, substituted lower alkyl wherein the substituents are monohydroxy, dihydroxy or acylamino; acylloweralkyl and arloweralkyl; and,

the pharmaceutically acceptable salts thereof, wherein in said R^1–R^6 groups, unless stated otherwise,

the alkyl substituents denote straight and branched chain hydrocarbons of C_1–C_{12};

loweralkyl denotes alkyl groups of C_1 to C_8;

alkenyl and alkynyl denote alkyl groups as defined above which are modified so that each contains a carbon to carbon double bond or triple bond, respectively;

cycloalkyl denotes rings composed of 5 to 8 methylene groups, each which may be substituted or unsubstituted with other hydrocarbon substituents;

benzofused cycloalkyl groups denote a cycloalkyl ring of 5 to 8 carbon atoms to which is fused a benzene ring;

bicycloalkyl denotes two cycloalkyl rings of 5 to 8 carbon atoms each joined together in any allowable way;

loweralkoxy substituents denote a loweralkyl group as described above attached through an oxygen bridge;

the aralkyl and heteroaralkyl substituents denote aryl or heteroaryl groups as herein defined attached through a straight or branched chain hydrocarbon of from one to six carbon atoms;

aryl represents phenyl, naphthyl, or biphenyl;

heteroaryl represents any 5- or 6-membered aromatic ring containing from one to three heteroatoms selected from the group consisting of nitrogen, oxygen, and sulfur as well as any bicyclic group in which any of the above heterocyclic rings is fused to another aromatic ring; and

acylamino represents loweralkanoylamino and aroylamino.

9. A method for effecting angiotensin converting enzyme inhibition or treating hypertension which comprises administering to a patient in need of such effectation or treatment an angiotensin converting enzyme inhibitive or antihypertensively effective amount of a compound of claim 1.

4,873,236

CONDENSED DIAZEPINONES, PROCESSES FOR PREPARING THEM AND PHARMACEUTICAL COMPOSITIONS CONTAINING THESE COMPOUNDS

Wolfhard Engel; Wolfgang Eberlein; Gerhard Mihm, all of Biberach; Gunter Trummlitz, Warthausen; Norbert Mayer, Biberach, all of Fed. Rep. of Germany, and Adriaan De Jonge, Driebergen, Netherlands, assignors to Dr. Karl Thomae GmbH, Biberach an der Riss, Fed. Rep. of Germany

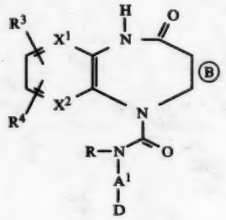
Filed Dec. 18, 1987, Ser. No. 136,212

Claims priority, application Fed. Rep. of Germany, Dec. 20, 1986, 3643666

Int. Cl.[4] A61K *31/55*; C07D *417/14*

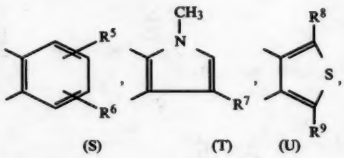
U.S. Cl. 514—220 6 Claims

1. A compound of the formula I

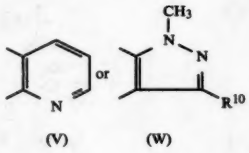


(I)

wherein ◯ represents one of the divalent groups

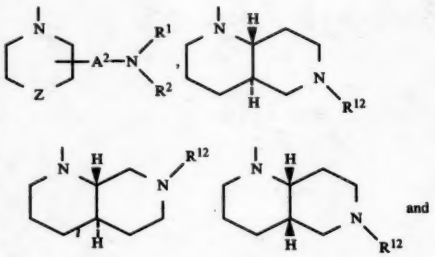


(S) (T) (U)



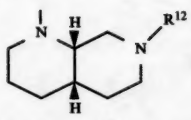
(V) (W)

and D represents the groups



and

-continued



and X^1, X^2, A^1, A^2, R, R^1 to R^{10}, R^{12} and Z have the following meanings:

X^1 and X^2 represent a =CH— group or, if assumes the meanings of the above-mentioned divalent groups S, U or W, both or only X^1 or only X^2 may also represent a nitrogen atom;

A^1 is a straight-chained or branched saturated alkylene group with two to seven carbon atoms;

A^2 is a straight-chained or branched saturated alkylene group with 1 to 5 carbon atoms or, if it is in the 3-position relative to the nitrogen of the saturated heterocyclic ring, it may also represent a single bond;

Z represents a single bond, an oxygen or sulphur atom, a methylene or 1,2-ethylene group;

R represents a hydrogen atom or a methyl group;

R^1 represents a branched or unbranched alkyl group with 1 to 4 carbon atoms;

R^2 represents a branched or unbranched alkyl group with 1 to 7 carbon atoms which may optionally also be substituted by a hydroxy group at its second to seventh carbon atom, or a cycloalkyl or cycloalkylmethyl group with 3 to 7 carbon atoms in the ring, whilst the cycloalkyl ring may optionally also be substituted by a hydroxy group;

R^1 and R^2 may, however, also form, together with the nitrogen atom between them, a 4- to 7-membered saturated, monocyclic, heterocyclic ring, bonded via its nitrogen atom to A^2, or such a 6-membered ring which may optionally be interrupted in position 4 by an oxygen atom or by the N—CH_3 group;

R^3 is an alkyl group with 1 to 4 carbon atoms, a chlorine atom or a hydrogen atom;

R^4 represents a hydrogen atom or a methyl group;

R^5 and R^6 each represent a hydrogen atom, a fluorine, chlorine or bromine atom or an alkyl group with 1 to 4 carbon atoms;

R^7 represents a hydrogen or chlorine atom or a methyl group;

R^8 represents a hydrogen atom or an alkyl group with 1 to 4 carbon atoms;

R^9 represents a hydrogen or halogen atom or an alkyl group with 1 to 4 carbon atoms;

R^{10} represents a hydrogen atom or a methyl group and

R^{12} represents a branched or unbranched alkyl group with 1 to 6 carbon atoms,

whilst if represents the divalent group T and R^7 is a hydrogen atom, R^3 cannot represent a chlorine atom and Z cannot represent a sulphur atom,

or a physiologically acceptable acid addition salt thereof.

6. A method for treating bradycardia or bradyarrhyrhmia which comprises administering to a host suffering from either of these conditions a therapeutic amount of a compound of formula I, as set forth in claims 1, 2, 3 or 4.

4,873,237

2,3-DIHYDRO- THIAZOLO- AND THIAZINO-BENZIMIDAZOLES AS ATNI-HYPER SECRETION AGENTS

Roger Crossley, Reading, England, assignor to John Wyeth & Brother Limited, Maidenhead, England

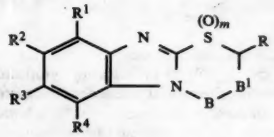
Continuation-in-part of Ser. No. 619,870, Jun. 12, 1984, abandoned. This application May 22, 1986, Ser. No. 866,636

Claims priority, application United Kingdom, Jun. 18, 1983, 8316645

Int. Cl.[4] A61K *31/54;* **C07D** *513/04*

U.S. Cl. 514—222.8 **22 Claims**

1. A method of treating ulcers or hypersecretion in a mammal which method comprises administering to said mammal in need of such treatment an effective amount of a compound of formula:



(I)

or a pharmaceutically acceptable salt thereof, wherein

—B—B^1— represents a chain of formula

$$—(CHR^5)_n—CHR^6—$$ (Ia)

R represents phenyl, naphthyl or an heteroaryl radical selected from the group pyridyl, thienyl, furyl, thiazolyl, quinolyl, isoquinolyl and indolyl each optionally substituted by not more than three substituents the same or different selected from lower alkylthio, lower alkyl, lower alkoxy, halogen, alkanyloxy of 2 to 7 carbon atoms, lower alkoxycarbonyl, halolower alkyl, hydroxy, cyano, amino, mono- or diloweralkyl amino, lower alkanoylamino, carboxy, carboxylower alkyl, hydroxylower alkyl, carbamoyl, carbamoyloxy, lower alkyl- or phenyl- carbonyl, (loweralkoxy) lower alkoxy, [1-piperidinyl, 4-morpholinyl, 4-lower alkylpiperazinyl, 1-pyrrolidinyl,]OR[8], SR[8], phenyl and phenyl substituted by one or more substituents as hereinbefore defined excepting phenyl; (where R^8 is C_2–C_6 alkenyl, C_3–C_{10} cycloalkyl, phenyl, phenylloweralkyl or phenyl or phenylloweralkyl each carrying from 1 to 3 substituents on the phenyl selected from lower alkyl, halogen, nitro, haloloweralkyl, hydroxy and lower alkoxy);

R^1, R^2, R^3 and R^4 independently represent hydrogen, or a substituent as mentioned above in connection with the group R, or any adjacent pair of R^1, R^2, R^3 and R^4 together with the carbon atoms to which they are attached complete a six membered fully unsaturated carbocyclic ring, said ring being optionally substituted by a substituent as defined above in connection with the group R;

R^5 and R^6 independently represent hydrogen or lower alkyl; n and m independently represent 0 or 1; the term 'lower' means a group having 1 to 6 carbon atoms.

4,873,238

2-PYRIDINECARBOTHIOAMIDES AND PHARMACEUTICAL COMPOSITIONS COMPRISING THE SAME

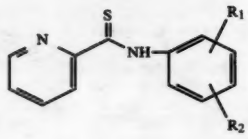
William A. Kinney, Langhorne, Pa., and Nancy E. Lee, Edison, N.J., assignors to American Home Products Corporation, New York, N.Y.

Filed Sep. 19, 1988, Ser. No. 246,475

Int. Cl.[4] A61K *31/44, 31/54;* **C07D** *213/32, 401/06*

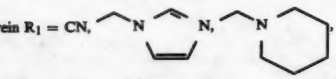
U.S. Cl. 514—227.8 **13 Claims**

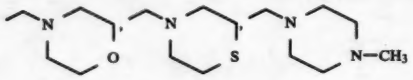
1. The compounds of structural formula (I),



(I)

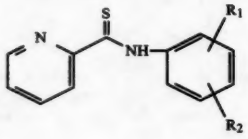
wherein R_1 = CN,





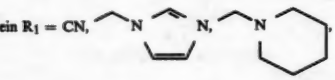
R_2=H or F, and the pharmaceutically acceptable salts thereof.

13. The method of treating ulcers or inducing cytoprotection in humans by increasing the natural defences of the gastrointestinal mucosa, which comprises administering to a human in need of such therapy an effective amount of a compound of structural formula (I)



(I)

wherein R_1 = CN,



and R_2=H or F and the pharmaceutically acceptable salts thereof.

4,873,239

ARYLTHIADIAZOLYLSULFONAMIDES AND DERIVATIVES

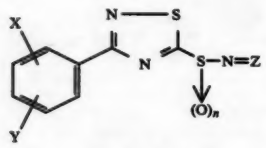
John J. Tegeler, Bridgewater, and Kirk D. Shoger, Piscataway, both of N.J., assignors to Hoechst-Roussel Pharmaceuticals, Inc., Somerville, N.J.

Division of Ser. No. 8,225, Jan. 29, 1987, Pat. No. 4,758,578. This application May 3, 1988, Ser. No. 189,919

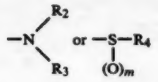
Int. Cl.[4] **C07D** *285/08, 417/12;* **A61K** *31/41*

U.S. Cl. 514—227.8 **26 Claims**

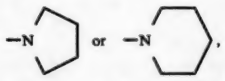
1. A compound having the formula



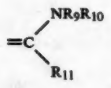
where n is 0, 1 or 2; X and Y are independently hydrogen, loweralkyl, loweralkoxy, aryllowеralkyl, aryloxy, halogen, $-CF_3$, $-NO_2$, $-OH$, $-OCOR_1$,



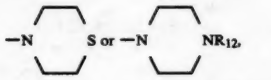
where R_1 is loweralkyl, aryllowеralkyl, aryl or loweralkoxy, R_2 is hydrogen, loweralkyl or loweralkylcarbonyl, R_3 is hydrogen or loweralkyl, or the group $-NR_2R_3$ as a whole is



m is 0, 1 or 2, and R_4 is hydrogen, loweralkyl or aryl; and Z is



where R_9 and R_{10} are each independently loweralkyl or the group $-NR_9R_{10}$ as a whole is



R_{12} being hydrogen, loweralkyl or aryl, and R_{11} is hydrogen, loweralkyl or aryl; or a pharmaceutically acceptable salt thereof.

4,873,240

METHOD FOR ADMINISTERING ETHANOLAMINE DERIVATIVES TO LIVESTOCK

Jonathan R. Arch, Banstead, England, assignor to Beecham Group p.l.c., England

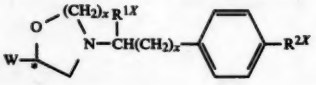
Division of Ser. No. 937,030, Oct. 30, 1986. This application Jul. 8, 1988, Ser. No. 216,872

Claims priority, application United Kingdom, Mar. 1, 1985, 8505284; Aug. 22, 1985, 8521068

Int. Cl.[4] **A61K** *31/535, 31/42*

U.S. Cl. 514—231.5 **4 Claims**

1. A method for increasing the weight gain and/or improving the feed utilization efficiency of livestock, which method comprises the oral or non-oral administration to livestock of an effective, non-toxic amount of a compound formula (XX):



(XX)

or a salt thereof, in which

W is phenyl optionally substituted by halogen or trifluoromethyl, or a benzofuran-2-yl group, R1x is hydrogen or methyl, R^{2x} is carboxyl or a group $O—Z^4—CO_2H$ or an ester or amide thereof; a group $O—E^1—NR^{3x}R^{4x}$ or a

group O—E^1—OR^{5x}, wherein R^{3x}, R^{4x} and R^{5x} each represents hydrogen or C_{1-6} alkyl, Z^4 is a C_{1-6} straight or branched alkylene chain, x is 1 or 2, y is 2 or 3, and E^1 is C_{2-7} straight or branched alkylene chain with at least two carbon atoms separating the two heteroatoms in the group R^{2x}.

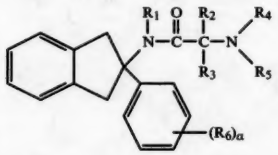
4,873,241

2-AMINO-N-(2-PHENYLINDAN-2-YL)ACETAMIDES USEFUL AS ANTI-EPILEPTICS

James J. Napier, Chili, and Ronald C. Griffith, Pittsford, both of N.Y., assignors to Fisons Corporation, Rochester, N.Y.

Filed Oct. 31, 1988, Ser. No. 265,087
Int. Cl.[4] C07D *295/14;* A61K *31/535*
U.S. Cl. 514—237.8 **21 Claims**

1. A compound having the formula:



(I)

or pharmaceutically acceptable acid addition salts thereof, including such compounds and salts thereof in the form of their enantiomers, or mixtures of their enantiomers,

a=0 to 3,

R_1, R_2 and R_3 are independently selected from hydrogen and methyl,

R_4 is hydrogen, or C_1–C_4 alkyl,

R_5 is selected from hydrogen, or C_1–C_4 alkyl, cyclopropyl and (aminomethyl)carbonyl, or

R_4 and R_5 taken together with the nitrogen atom to which they are attached from a heterocyclic ring selected from pyrrolidinyl, piperidinyl and morpholinyl, or

R_3 and R_4 taken together with the carbon atom and nitrogen atom to which they are respectively attached form a heterocyclic ring selected from pyrrolidinyl and piperidinyl, and

R_6 is selected from hydrogen, halogen, C_1–C_4 alkoxy, trifluoromethyl, C_1–C_4 alkyl and combinations thereof.

21. A method of treating a warm-blooded animal for epilepsy comprising administering to such animal an effective amount of a compound according to claim **1**.

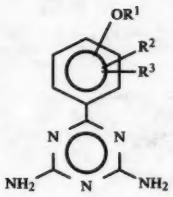
4,873,242

2,4-DIAMINO-6-SUBSTITUTED-PHENYL-S-TRIAZINES AS NOOTROPIC AGENTS

Kiyoshi Kimura, Osake; Fusao Ueda, Shiga, and Takashi Ogasawara, Uji, all of Japan, assignors to Nippon Shinyaku Co., Ltd., Japan

Filed May 20, 1988, Ser. No. 197,102
Claims priority, application Japan, May 20, 1987, 62-124624
Int. Cl.[4] A61K *31/53*
U.S. Cl. 514—242 **9 Claims**

1. A method of treating dementia in humans and animals which comprises administering to a human or animal in need thereof a therapeutically effective amount of a compound of the formula I:



(I)

or a pharmaceutically acceptable salt thereof wherein R^1 is hydrogen or lower alkyl and R^2 and R^3 are the same or different and each is hydrogen, lower alkoxy or halo, in combination with a pharmaceutically acceptable carrier.

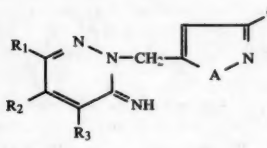
4,873,243

DERIVATIVES OF 3-IMINO-PYRIDAZINE, PROCESS FOR OBTAINING THEM AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Camille G. Wermuth, Strasbourg; Gilbert Schlewer, Ostwald, and Michel Heaulme, Baillargues, all of France, assignors to SANOFI, Paris, France

Filed Oct. 28, 1986, Ser. No. 923,901
Claims priority, application France, Oct. 30, 1985, 85 16157
Int. Cl.[4] C07D *413/06, 417/06, 413/14;* A61K *31/50*
U.S. Cl. 514—248 **6 Claims**

1. Derivatives of 3-imino-2,3-dihydro-pyridazines, having the formula:



(I)

in which:

A represents an atom of oxygen or of sulfur;

R_1 represents a C_1–C_4 alkyl group, or an aromatic group selected from:

the phenyl group;

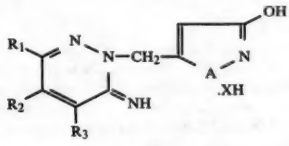
the phenyl group which is mono- or poly-substituted by halogen group, a C_1–C_4 alkyl group, a C_1–C_4 alkoxy group, a nitro group, a hydroxy or methylene-dioxy group;

the napththyl group;

the furyl group;

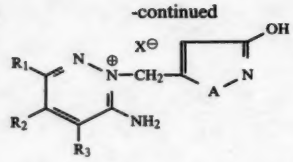
the thienyl group or the pyridyl group;

R_2 and R_3 each designate independently hydrogen or a lower alkyl group; a phenyl group, or R_2 and R_3, taken together, constitute, with the 2 atoms of the pyridazinic cycle to which they are bonded, a benzene ring; and the addition salts of these compounds, with pharmaceutically acceptable acids, corresponding to formulae I′ or I″:



(I′)

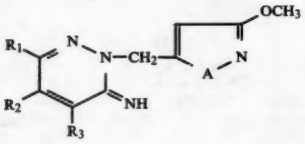
-continued



(I")

in which R_1, R_2, R_3 and A are defined hereinabove and X represents the anion of an acid.

5. Derivatives of 3-imino-2,3-dihydro-pyridazines, which have the formula:



(II)

in which:

A represents an atom of oxygen or of sulfur;

R_1 represents a C_1–C_4 alkyl group, or an aromatic group selected from:

the phenyl group;

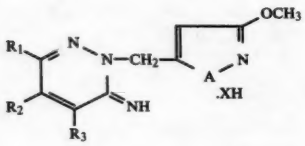
the phenyl group which is mono- or polysubstituted by a halogen group, a C_1–C_4 alkyl group, a C_1–C_4 alkoxy group, a nitro group, a hydroxy or methylene-dioxy group;

the naphthyl group;

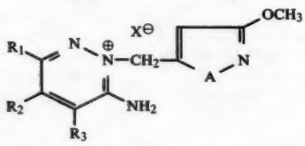
the furyl group;

the thienyl group or the pyridyl group;

R_2 and R_3 each designate independently hydrogen or a lower alkyl group; a phenyl group, or R_2 and R_3, taken together, constitute, with the 2 atoms of the pyridazinic cycle to which they are bonded, a benzene ring; and the addition salts of these compounds of formulae:



(II')



(II")

in which R_1, R_2, R_3 and A are as defined hereinabove and X represents the anion of a pharmaceutically acceptable acid.

6. A pharmaceutical composition having anti-depressant action, wherein said composition contains an effective amount of a derivative of 3-imino-2,3-dihydropyridazine according to claim 1 in combination with a carrier.

4,873,244

TRICYCLIC HETEROCYCLIC COMPOUNDS AS PSYCHOPHARMACEUTICALS

Frank Wäjen, Vaerlose, and Holger C. Hansen, Ballerup, both of Denmark, assignors to A/S Ferrosan, Soborg, Denmark

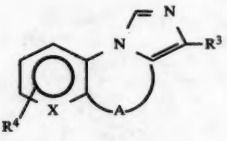
Filed Feb. 16, 1988, Ser. No. 156,363

Claims priority, application Denmark, Mar. 18, 1987, 1374/87

Int. Cl.[4] A61K *31/505;* **C07D** *471/14, 487/04*

U.S. Cl. 514—250 **9 Claims**

1. A heterocyclic compound having the formula I



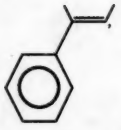
(I)

wherein

R^3 is CO_2R' or $CONR'R''$, wherein

R' and R'' independently are C_{1-6}-alkyl;

—A—is —C(=O)—NR'''—, NR'''—C(=O)—, or



wherein

R''' is C_{1-6}-alkyl;

X is C or N; and

R^4 is hydrogen or halogen; provided, however, that A is not —C(=O)—NR''' or —NR'''—C(=O)— when R^3 is CO_2R' and X is C and further provided that A is not —NR'''—C(=O)—when R^3 is $CONR'R'''$ and X is C.

8. Method of treating a central nervous system ailment associated with the benezodiazepine receptors in a subject in need of such treatment comprising the step of administering to said subject an amount of a compound of claim 1 which is effective for the alleviation of such ailment.

4,873,245

ISOLATION AND STRUCTURAL ELUCIDATION OF CEPHALOSTATINS 1-4

George R. Pettit, Paradise Valley, and Yoshiaki Kamano, Tempe, both of Ariz., assignors to Arizona Board of Regents, Tempe, Ariz.

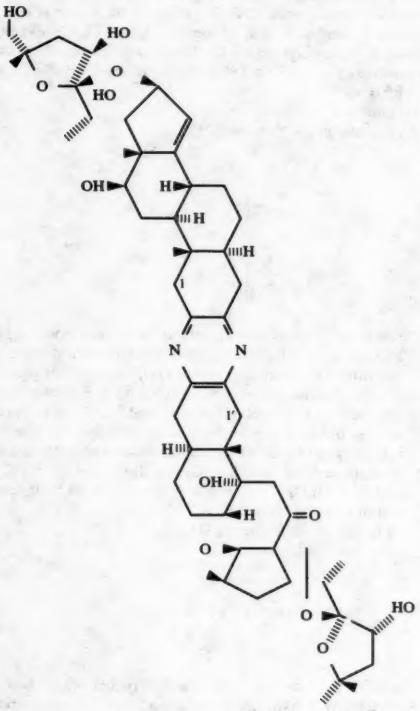
Filed Mar. 14, 1988, Ser. No. 167,550

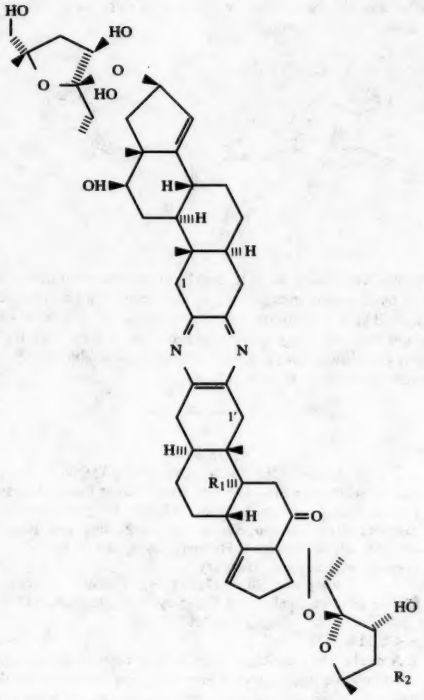
Int. Cl.[4] C07D *491/22;* **A61K** *31/495*

U.S. Cl. 514—250 **24 Claims**

1. A substance for inhibiting P388 lymphocytic leukemia selected from the group denominated cephalostatin 1, cephalostatin 2, cephalostatin 3, and cephalostatin 4.

2. An substance according to claim 1 having the structure:





wherein: R_1 is H or OH and R_2 is H or CH_3.

3. An substance according to claim 1 having the structure:

4,873,246

6-(ACYLAMINOARYL)-3(2H)-PYRIDAZINONE DERIVATIVES, AND THEIR USE

Philip A. Rossy, Hillsdale, N.J.; Marco Thyes, Ludwdigshafen, Fed. Rep. of Germany; Albrecht Franke, Wachenheim; Horst Koenig, Ludwigshafen, Fed. Rep. of Germany; Hans D. Lehmann, Hirschberg, Fed. Rep. of Germany; Josef Gries, Wachenheim, Fed. Rep. of Germany; Ludwig Friedrich, Bruehl, Fed. Rep. of Germany, and Dieter Lenke, Ludwigshafen, Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Division of Ser. No. 571,675, Jan. 17, 1984, Pat. No. 4,636,504. This application Oct. 8, 1986, Ser. No. 916,843

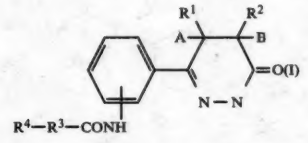
Claims priority, application Fed. Rep. of Germany, Jan. 22, 1983, 3302021

The portion of the term of this patent subsequent to Jan. 13, 2004, has been disclaimed.

Int. Cl.[4] C07D *237/14;* A61K *31/50*

U.S. Cl. 514—252 **3 Claims**

1. A 6-(alkanoylaminoaryl)-3(2H)-pyridazinone derivative of the formula I

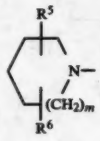


where the substituents on the phenylene radical are para to one

another, A and B are each hydrogen or together form a bond, R^1 is hydrogen or methyl, R^2 is hydrogen, or, where A and B are each hydrogen, R^1 and R^2 together form a C_1–C_2-alkylene radical, R^3 is a straight-chain C_2–C_4-alkylene group which can be substituted by C_1–C_3-alkyl group or by two methyl groups, and R^4 is

(a) imidazol-1-yl, or

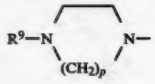
(b) a group of the formula (II)



(II)

where the broken line can be an additional bond, R^5 is hydrogen, a C_1–C_4-alkyl radical which is unsubstituted or substituted by phenyl, or cyclohexyl, hydroxyl, or phenyl which is unsubstituted or substituted by one or two halogen atoms, C_1–C_4-alkyl groups and/or, C_1–C_4-alkoxy groups, or is a group of the formula R^7R^8N—, where R^7 is hydrogen or phenyl which can be monosubstituted or disubstituted by halogen, C_1–C_4-alkyl, and/or C_1–C_4-alkoxy, R^8 is C_1–C_4-alkanoyl or benzoyl, R^6 is hydrogen, and m is 0, 1 or 2, or

(c) a group of the formula (III)



(III)

wherein R^9 is a C_1–C_3-hydrocarbon radical which is substituted by a hydroxy group or a C_4–C_{14}-hydrocarbon radical which may be substituted by a hydroxyl group, and p is 2, and their salts with physiological tolerated acids.

4,873,247

DERIVATIVES OF PARAHERQUAMIDE ISOLATED FROM A FERMENTATION BROTH ACTIVE AS ANTIPARASITIC AGENTS

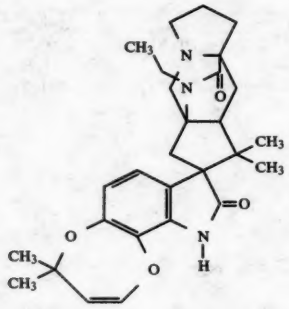
Robert T. Goegelman, 437 Acadeny Terr., Linden, N.J. 07036, and John G. Ondeyka, 12 Nichols Ct., Fanwood, N.J.

Filed Nov. 27, 1987, Ser. No. 126,061

Int. Cl.[4] A61K *31/495;* **C07D** *491/22*

U.S. Cl. 514—257 **14 Claims**

1. A compound having the formula:



4,873,248

PYRIDINYLPYRIMIDINES HAVING FUNGICIDAL ACTIVITY

Tsuguhiro Katoh, Osaka; Kiyoto Maeda; Masao Shiroshita, both of Hyogo; Norihisa Yamashita, Osaka; Yuzuru Sanemitsu, and Satoru Inoue, both of Hyogo, all of Japan, assignors to Sumitomo Chemical Co., Ltd., Osaka, Japan

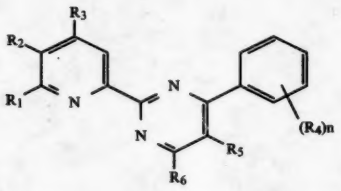
Filed Dec. 3, 1987, Ser. No. 128,654

Claims priority, application Japan, Dec. 3, 1986, 61-288350

Int. Cl.[4] A61K *31/44, 31/505;* **A01N** *43/54;* **C07D** *239/26, 239/34*

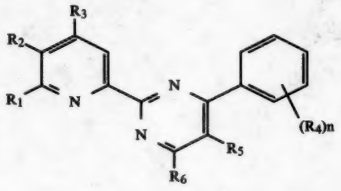
U.S. Cl. 514—269 **11 Claims**

1. A pyridinylpyrimidine compound of the formula:



wherein R_1 is lower alkyl; R_2 and R_3 are, the same or different, each hydrogen or methyl; R_4 is, the same or different, each lower alkyl, lower alkoxy, lower haloalkyl or halogen; n is an integer of 0–3; R_5 is hydrogen or lower alkyl and R_6 is hydrogen, lower alkyl, lower alkoxy, lower alkenyloxy or lower alkylthio, or its salt.

11. A method for controlling fungi which comprises applying a fungicidally effective amount of a pyridinylpyrimidine compound of the formula:



wherein R_1 is lower alkyl; R_2 and R_3 are, the same or different, each hydrogen or methyl; R_4 is, the same or different, each lower alkyl, lower alkoxy, halo(lower)alkyl or halogen; n is an integer of 0 to 3; R_5 is hydrogen or lower alkyl and R_6 is hydrogen, lower alkyl, lower alkoxy, lower alkenyloxy or lower alkylthio, or its salt to fungi.

4,873,249

PHARMACEUTICAL COMPOSITION

Lujza Petöcz; István Simonyi; Iván Beck; Gábor Gigler; Márton Fekete; Enikö Kiszelly; Attila Mándi; Frigyes Görgényi; András Dietz; Katalin Süimeg née Zukovics, and Elemér Jákfalvi, all of Budapest, Hungary, assignors to EGIS Gyogyszergyar, Budapest, Hungary

Filed Feb. 20, 1987, Ser. No. 17,090

Claims priority, application Hungary, Feb. 28, 1986, 842/86

Int. Cl.[4] A61K *31/505*

U.S. Cl. 514—275 **7 Claims**

1. A method of treating an individual in need of an analgesic or anti-inflammatory agent comprising administering to the individual a pharmaceutical composition containing a pharmaceutically effective amount of 2,4-diamino-5-(3,4-dimethoxybenzyl)-pyrimidine or a pharmaceutically acceptable acid addition salt thereof.

4,873,250
ANTIMICROBIAL COMPOUND AND COMPOSITIONS PARTICULARY EFFECTIVE AGAINST CANDIDA ALBICANS

Charles D. Hufford, and Alice M. Clark, both of Oxford, Miss., assignors to The University of Mississippi, University, Miss.

Filed Jul. 14, 1988, Ser. No. 218,993
Int. Cl.[4] C07D *471/00*; A61K *31/44*
U.S. Cl. 514—290 **3 Claims**

1. An antimicrobial composition consisting essentially of onychine in a therapeutically-effective concentration and a non-toxic, pharmaceutically-acceptable carrier.

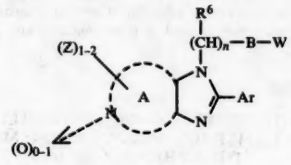
2. A method for preventing pathological conditions in mammals brought about by the presence of *Candida albicans* organism comprising administering to said mammals in a therapeutically-effective concentration, a composition consisting essentially of onychine and a non-toxic, pharmaceutically-acceptable carrier.

4,873,251
METHOD OF TREATING ANIMALS USING FUSED IMIDAZOHETEROCYCLIC COMPOUNDS

Bruce E. Tomczuk, and Deborah S. Sutherland, both of Richmond, Va., assignors to A. H. Robins Company, Incorporated, Richmond, Va.

Division of Ser. No. 871,772, Jun. 9, 1986, Pat. No. 4,772,600. This application Jul. 5, 1988, Ser. No. 215,170
Int. Cl.[4] A61K *31/435, 31/535*
U.S. Cl. 514—303 **5 Claims**

1. A method for the treatment of a living animal body for muscle tension and spasticity and/or anxiety and/or convulsions which comprises administering a compound selected from the group having the formula:



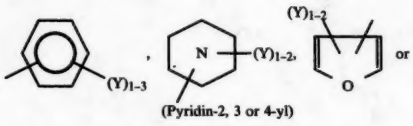
wherein;

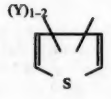
A represents a heterocyclic ring having two of its carbon atoms held mutually with the imidazo moiety, selected from the group consisting of pyridine in any of its four positions wherein nitrogen is unshared by the imidazo moiety and substituted by one or two Z radicals on a carbon not shared by the imidazo moiety selected from the group consisting of hydrogen, halogen, loweralkyl, hydroxy, loweralkoxy, diloweralkylamino or nitro;

n is 1 to 3;

R^6 is hydrogen or loweralkyl;

Ar is selected from:





B is carbonyl;

W is selected from:

$-NR^2(CH_2)_pOR^1$

$-NR^2(CH_2)_pNHC(O)R^1$],

$-NR^2(CH_2)_pAr^1$ wherein Ar^1 is selected from the same group as Ar,

$-NR^3R^4$, or

$-NR^2(CH_2)_pNR^3R^4$,

wherein R^1 and R^2 are selected from hydrogen, loweralkyl, $(Y)_{1-3}$-phenyl, or $(Y)_{1-3}$-phenyl-loweralkyl and R^3 and R^4 are selected from:

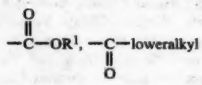
hydrogen,
loweralkyl,
loweralkenyl,
cycloalkyl,
cycloalkyl-loweralkyl,
$(Y)_{1-3}$-phenyl, $(Y)_{1-3}$-phenyl-loweralkyl,
$(Y)_{1-2}$-pyridin-2, 3, or 4-yl, or

R^3 and R^4 when taken together with the adjacent nitrogen atom may form a heterocyclic amino radical selected from:

azetidin-1-yl,
pyridin-1-yl,
loweralkyl-piperidin-1-yl,
morpholin-4-yl,
4-R^5-piperazin-1-yl,
thiazolidin-3-yl,

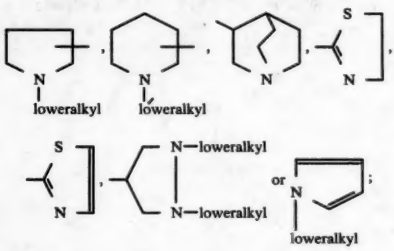
P is 0–3;

R^5 is selected from loweralkyl,



or $(Y)_{1-3}$-phenyl;

Q is selected from:



wherein all of the above Y is hydrogen, halo, loweralkoxy, loweralkyl, trifluoromethyl, cyano, nitro or diloweralkylamino;

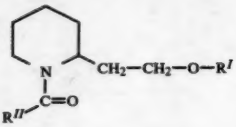
the optical isomers, the oxides represented by $\rightarrow O$ and the pharmaceutically acceptable acid addition salts thereof.

4,873,252
ACYLATED AMINOALCOHOLS FOR REPELLING INSECTS AND MITES

Bernd-Wieland Krüger, Wuppertal; Klaus Sasse, Bergisch-Gladbach; Franz-Peter Hoever; Günther Nentwig, both of Cologne, and Wolfgang Berhrenz, Overath, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Mar. 9, 1988, Ser. No. 165,684
Claims priority, application Fed. Rep. of Germany, Mar. 12, 1987, 3708033
Int. Cl.[4] A01N *43/40*; C07D *211/22*
U.S. Cl. 514—315 **7 Claims**

1. An acrylated α,ω-aminoalcohol derivative of the formula



wherein

R^I represents hydrogen, COR^{11}, $COOR^{12}$ or R^{13}, wherein R^{11}, R^{12} and R^{13} are identical or different and represent alkyl containing up to twelve carbon atoms or alkenyl containing up to ten carbon atoms and

R^{II} represents C_2–C_6-alkyl, or represents C_3–C_6-alkenyl.

6. An insect- and mite-repellent composition comprising an amount effective therefor of a compound according to claim 1 and a diluent.

4,873,253

PHENYLALANINE DERIVATIVE AND PROTEINASE INHIBITOR

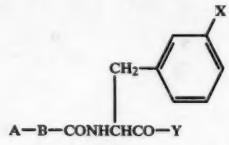
Shosuke Okamoto, 15-18, Asahigaoka 3-chome, Tarumi-ku, Kobe-shi, Hyogo; Yoshio Okada, Akashi; Akiko Okunomiya, Kobe; Taketoshi Naito, Ohta; Yoshio Kimura, Ohta; Morihiko Yamada, Ohta; Norio Ohno, Ohta; Yasuhiro Katsuura, Ohta; Hiroshi Nojima, Ohta, and Takashi Shishikura, Ohta, all of Japan, assignors to Shosuke Okamoto, Hyogo and Showa Denko Kabushiki Kaisha, Tokyo, both of, Japan

Filed Mar. 30, 1987, Ser. No. 31,738

Int. Cl.[4] A61K *31/44;* **C07C** *79/46;* **C07D** *401/00, 233/66*

U.S. Cl. 514—352 **20 Claims**

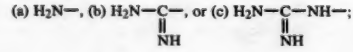
1. A phenylalanine derivative having the formula (I):



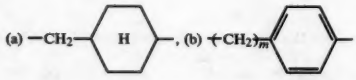
(I)

wherein

A represents



B represents



or (c) $+CH_2\rangle_n$,

wherein m is 0, 1, 2 and n is 3, 4, or 5;

X represents (a) hydroxy, (b) nitro, (c) amino, (d) phenoxy which may be substituted with (i) halogen or (ii) nitro, (e) C_1–C_4 alkyloxy which may be substituted with (i) phenyl or (ii) benzoyl, (f) benzoyl, (g) pvridyloxy which may be substituted with (i) halogen or (ii) nitro, or (h) C_1–C_4 alkyl which may be substituted with halogen;

Y represents

or $—OR^3$ wherein

R^1 and R^2 are independently (a) hydrogen, (b) phenyl which, may be substituted with (i) benzoyl, (i) C_1–C_4 alkylcarbonyl, (iii) C_1–C_4 alkyl which may be further substituted with C_1–C_4 alkoxycarbonyl or hydroxycarbonyl, (iv) C_2–C_5 alkenyl which may be further substituted with hydroxycarbonyl or C_1–C_4 alkoxycarbonyl, (v) C_1–C_4 alkoxycarbonl, or (vi) amidino, (c) pyridyl which may be substituted with halogen or carboxyl (d) imidazolyl, (e) pyrimidyl, (f) tetrazolyl, (g) thiazolyl which may be substituted with C_1–C_4 alkyl which may be further substituted with C_1–C_4 alkoxycarbonyl, (h) C_1–C_6 alkyl which may be substituted with C_1–C_4 alkoxy, C_1–C_4 alkoxycarbonyl, phenyl, or benzoyl, (i) C_5–C_7 cycloalkyl which may be substituted with C_1–C_4 alkoxycarbonyl or (j) $R^1$and R^2 may form, with the nitrogen atom attached thereto, (i) piperazyl which may be substituted on the nitrogen atom with C_1–C_4 alkyl which may be further substituted with phenyl, (ii) piperidino which may be substituted with carboxyl or C_1–C_4 alkoxycarbonyl, (iii) pyrrolidyl which may be substituted with C_1–C_4 alkoxycarbonyl, or (iv) morpholyl; and

R^3 represents (a) hydrogen, (b) C_1–C_6 alkyl which may be substituted with (i) C_1–C_4 alkoxy, (ii) phenyl, or (iii) pyridyl, or (c) pyridyl; or a pharmaceutically acceptable salt thereof.

3. A proteinase inhibitor composition comprising as an essential component a therapeutically effective amount of the phenylalanine derivative of claim 1 or the pharmaceutically acceptable salt thereof and a pharamaceutically acceptable carrier.

4,873,254

1,4-DIHYDROPYRIDINES SUBSTITUTED BY 3-ARYLOXY-2-HYDROXYPROPYL AMINO MOIETY IN THE 4-PHENYL GROUP

Rodney B. Hargreaves, Poynton; Bernard J. McLoughlin, and Stuart D. Mills, both of Macclesfield, all of England, assignors to Imperial Chemical Industries plc, London, England

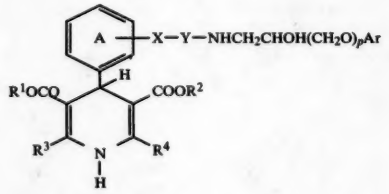
Filed Feb. 11, 1986, Ser. No. 828,363

Claims priority, application United Kingdom, Feb. 11, 1985, 8503425

Int. Cl.[4] C07D *211/86;* **A61K** *31/455*

U.S. Cl. 514—356 **13 Claims**

1. A dihydropyridine of the formula:



wherein R^1 and R^2, which may be the same or different, each is alkyl or alkoxyalkyl each of up to 6 carbon atoms; wherein R^3 and R^4, which may be the same or different, each is alkyl of up to 6 carbon atoms;

wherein benzene ring A bears one or more additional substituents selected from halogeno, cyano, nitro, trifluoromethyl and alkyl of up to 6 carbon atoms,

wherein Ar is phenyl, naphthyl, tetrahydronaphthyl, inda-

nyl or indenyl which is unsubstituted or which bears one or more substituents selected from halogeno, trifluoromethyl, hydroxy, amino, nitro, carbamoyl and cyano, and alkyl, alkenyl, alkoxy, alkenyloxy, alkoxyalkoxy, alkylthio, alkanoyl, carbamoylalkyl and alkanoylamino each of up to 6 carbon atoms;

wherein p is 0 or 1;

wherein X is —O— or —S—; and

wherein Y is a group of the formula $-(CH_2)_mC(CH_3)_2-$ wherein m is 2, 3, 4 or 5,

or an acid-addition salt thereof.

4,873,255

THIAZOLIDINONE DERIVATIVES, THEIR PREPARATION AND THEIR USE

Takao Yoshioka; Tsutomu Kanai; Yuichi Aizawa; Hiroyoshi Horikoshi, and Kazuo Hasegawa, all of Hiromachi, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

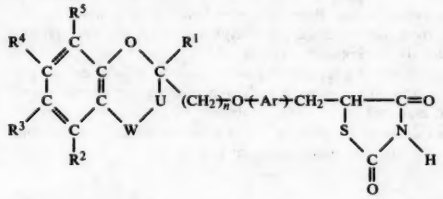
Filed Feb. 3, 1988, Ser. No. 151,807

Claims priority, application Japan, Feb. 4, 1987, 62-22508

Int. Cl.[4] C07D *417/12*; A61K *31/425*

U.S. Cl. 514—369 **22 Claims**

1. A compound of formula (I):



in which:

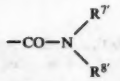
R^1 represents a hydrogen atom, a C_1–C_{25} alkyl group, an aralkyl group, a C_3–C_{10} cycloalkyl group or a substituted C_3–C_{10} cycloalkyl group having at least one substituent selected from the group consisting of C_1–C_6 alkyl groups;

R^2, R^4 and R^5 are independently selected from the group consisting of: hydrogen atoms; C_1–C_{25} alkyl groups; substituted C_1–C_{25} alkyl groups having at least one substituent selected from the group consisting of substituents (a); aralkyl groups; C_3–C_{10} cycloalkyl groups; substituted C_3–C_{10} cycloalkyl groups having at least one substituent selected from the group consisting of C_1–C_6 alkyl groups; aryl groups; halogen atoms; hydroxy groups; protected hydroxy groups in which the protecting group is selected from the group consisting of substituents (b); C_1–C_7 alkanoyl groups; substituted C_2–C_7 alkanoyl groups having at least one substituent selected from the group consisting of substituents (c); arylcarbonyl groups; cycloalkylcarbonyl groups in which the cycloalkyl part is C_3–C_{10}; substituted cycloalkylcarbonyl groups in which the cycloalkyl part is C_3–C_{10} and has at least one substituent selected from the group consisting of C_1–C_6 alkyl groups; carboxy groups; C_2–C_7 alkoxycarbonyl groups; aryloxycarbonyl groups; aralkyloxycarbonyl groups; nitro groups; groups of formula (II):

(II)

in which R^7 and R^8 are independently selected from the group consisting of hydrogen atoms, C_1–C_6 alkyl groups, aralkyl groups, C_3–C_{10} cycloalkyl groups, aryl groups, C_1–C_7 alkanoyl groups, aralkanoyl groups, arylcarbonyl groups and C_2–C_7 alkoxycarbonyl groups, or R^7 and R^8, together with the nitrogen atom to which they are attached, form a nitrogen-containing heterocyclic group having from 5 to 10 ring atoms, of which one is said nitrogen atom and from 0 to 3 are additional hetero-atoms selected from the group consisting of nitrogen, oxygen and sulfur hetero-atoms,

and groups of formula (III):



(III)

in which $R^{7'}$ and $R^{8'}$ are independently selected from the group consisting of hydrogen atoms, C_1–C_6 alkyl groups, aralkyl groups, C_3–C_{10} cycloalkyl groups and aryl groups or $R^{7'}$ and $R^{8'}$, together with the nitrogen atom to which they are attached, form a nitrogen-containing heterocyclic group having from 5 to 10 ring atoms, of which one is said nitrogen atom and from 0 to 3 are additional hetero-atoms selected from the group consisting of nitrogen, oxygen and sulfur hetero-atoms;

R^3 represents a hydrogen atom, a C_1–C_{25} alkyl group, a substituted C_1–C_{25} alkyl group having at least one substituent selected from the group consisting of substituents (a), an aralkyl group, a C_3–C_{10} cycloalkyl group, a substituted C_3–C_{10} cycloalkyl group having at least one substituent selected from the group consisting of C_1–C_6 alkyl groups, an aryl group, a halogen atom, a C_1–C_7 alkanoyl group, a substituted C_2–C_7 alkanoyl group having at least one substituent selected from the group consisting of substituents (c), an arylcarbonyl group, a cycloalkylcarbonyl group in which the cycloalkyl part is C_3–C_{10}, a substituted cycloalkylcarbonyl group in which the cycloalkyl part is C_3–C_{10} and has at least one substituent selected from the group consisting of C_1–C_6 alkyl groups, a carboxy group, a C_2–C_7 alkoxycarbonyl group, an aryloxycarbonyl group, an aralkyloxycarbonyl group, a nitro group, a group of formula (II) as defined above or a group of formula (III) as defined above;

Ar represents a divalent aromatic carbocylic group or a divalent aromatic heterocyclic group;

W represents a methylene group, a carbonyl group, a group of formula >CH—Oy in which Y represents a hydrogen atom, a C_1–C_7 alkanoyl group or an arylcarbonyl group, or

a group of formula >C=N—OV in which V represents a hydrogen atom, a C_1–C_6 alkyl group, a substituted C_1–C_6 alkyl group having at least one substituent selected from the group consisting of substituents (c), a C_1–C_7 alkanoyl group or an arylcarbonyl group;

U represents a single bond or a methylene group; or, when W represents a carbonyl group or said group of formula >C=N—OV, U, R^1 and the carbon atom to which R^1 is attached may together represent a group of formula —CH=C<;

or W-U may represent a carbon-carbon double bond; and

n represents an integer from 1 to 10;

said aralkyl groups have an alkyl portion containing from 1 to 6 carbon atoms and an aryl portion as defined below, the alkyl portion being unsubstituted or having at least one substituent selected from the group consisting of substituents (c);

substituents (a):

hydroxy groups; protected hydroxy groups in which the protecting group is selected from the group consisting of substituents (b); C_1–C_7 aliphatic carboxylic acyl groups; C_2–C_7 aliphatic carboxylic acyl groups having at least one substituent selected from the group consisting of substituents (c); arylcarbonyl groups; cycloalkylcarbonyl groups in which the cycloalkyl part is C_3–C_{10}; substituted cycloalkylcarbonyl groups in which the cycloalkyl part is C_3–C_{10} and having at least one substit-

uent selected from the group consisting of C_1–C_6 alkyl groups; carboxy groups; C_2–C_7 alkoxycarbonyl groups; aryloxycarbonyl groups; aralkyloxycarbony groups; hydroxyimino groups; protected hydroxyimino groups in which the protecting group is selected from the group consisting of substituents (b); groups of formula (II) as defined above; and groups of formula (III) as defined above;

substituents (b);

C_1–C_6 alkyl groups, substituted C_1–C_6 alkyl groups having at least one substituent selected from the group consisting of substituents (c), C_1–C_7 aliphatic carboxylic acyl groups, substituted C_2–C_7 aliphatic carboxylic acyl groups having at least one substituent selected from the group consisting of substituents (c), arylcarbonyl groups, C_2–C_7 alkoxycarbonyl groups, aryloxycarbonyl groups, groups of formula (III) as defined above and sulfo groups;

substituents (c)

carboxy groups, C_2–C_7 alkoxycarbonyl groups and aryl groups;

said aryl groups and the aryl parts of said aralkyl arylcarbonyl, aryloxycarbonyl, aralkyloxycarbonyl and divalent aromatic groups being C_6–C_{14} carbocyclic aryl groups which are unsubstituted or have at least one substituent selected from the group consisting of substituents (d);

said heterocyclic groups, heterocyclic parts of said heterocyclic acyl and acyloxy groups and said divalent heterocyclic aromatic groups have from 5 to 14 ring atoms, of which from 1 to 5 are hetero-atoms selected from the group consisting of nitrogen, oxygen and sulfur hetero-atoms, said heterocyclic groups being unsubstituted or having at least one substituent selected from the group consisting of substituents (d) and substituents (e);

substituents (d)

C_1–C_6 alkyl groups, C_1–C_6 alkoxy groups, hydroxy groups, sulfoxy groups, halogen atoms, nitro groups, groups of formula (II), as defined above, C_1–C_7 aliphatic carboxylic acyl groups, C_7–C_{11} aromatic carboxylic acyl groups, C_1–C_7 aliphatic carboxylic acylocy groups and C_7–C_{11} arylcarbonyloxy groups in which the aryl part is unsubstituted or has at least one substituent selected from the group consisting of C_1–C_6 alkyl groups, C_1–C_6 alkoxy groups and halogen atoms;

substituents (e)

aryl groups and oxygen atoms; and pharmaceutically acceptable salts thereof.

4,873,256

ANTIANDROGENIC 4-HYDROXYMETHYL-2-IMIDAZOLIDINE-DIONES

Daniel Coussediere, Montfermeil; Giuseppe Gigliotti, and Martine Moguilewsky, both of Paris, all of France, assignors to Roussel Uclaf, Paris, France

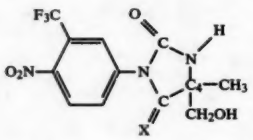
Filed Aug. 10, 1988, Ser. No. 230,587

Claims priority, application France, Aug. 13, 1987, 87 11544

Int. Cl.[4] A61K *31/415*; C07D *233/78, 233/88*

U.S. Cl. 514—391 **18 Claims**

1. A compound in all possible racemic and optically active forms of the formula



I

wherein =x is =0 or imino.

13. A method of inducing antiandrogenic activity in warm-blooded animals comprising administering to warm-blooded animals an antiandrogenically effective amount of at least one compound of claim 1.

4,873,257

SUSBTITUTED FUSED TETRAHYDROCARBAZOLE ACETIC ACID DERIVATIVES

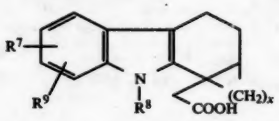
Dominick Mobilio, Franklin Park, N.J., assignor to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 184,468, Apr. 21, 1988, Pat. No. 4,783,479. This application Aug. 9, 1988, Ser. No. 230,101

Int. Cl.[4] C07D *209/82*; A61K *31/40*

U.S. Cl. 514—410 **10 Claims**

1. A compound of formula (Ia)



(Ia)

wherein R^7 is hydrogen, lower alkyl containing 1 to 6 carbon atoms or halogen; R^8 is hydrogen or lower alkyl containing 1 to 6 carbon atoms; R^9 is hydrogen, lower alkyl containing 1 to 6 carbon atoms, halogen, or acetyl; x is 1 to 5; and the pharmaceutically acceptable salts thereof.

10. A method for treating inflammatory, painful or allergic conditions in a mammal which comprises the administration to said mammal of an effective amount of a compound selected from those of formula (Ia), or a pharmaceutically acceptable salt thereof, as claimed in claim 1.

4,873,258

BENZO[C] CARBAZOLE PROPANEDIOL CONTAINING ANTI TUMOR COMPOSITIONS AND USE

Kenneth W. Bair, Chapel Hill, N.C., assignor to Burroughs Wellcome Co., Research Triangle Park, N.C.

Division of Ser. No. 128,638, Dec. 4, 1987, Pat. No. 4,797,495, which is a continuation of Ser. No. 801,087, Nov. 22, 1985, abandoned, which is a continuation-in-part of Ser. No. 673,356, Nov. 20, 1984, abandoned. This application Aug. 18, 1988, Ser. No. 234,186

Int. Cl.[4] A61K *31/40*

U.S. Cl. 514—411 **7 Claims**

1. A pharmaceutical composition containing 2-methyl-2-[[(7-methyl-7H-benzo[c[-carbazol-10-yl)methyl]amino]-1,3-propanediol or a pharmaceutically acceptable acid addition salt thereof with a pharmaceutically acceptable carrier therefor.

6. A method of reducing the number of cells of a susceptible tumor which comprises contacting said susceptible tumor cells with 2-methyl-2-[[(7-methyl-7H-benzo[c]-carbazol-10-yl)methyl]amino]-1,3-propanediol or a pharmaceutically acceptable acid addition salt thereof.

4,873,259

INDOLE, BENZOFURAN, BENZOTHIOPHENE CONTAINING LIPOXYGENASE INHIBITING COMPOUNDS

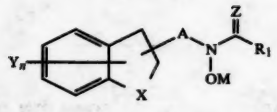
James B. Summers, Jr., Libertyville; Bruce P. Gunn, Island Lake, and Dee W. Brooks, Libertyville, all of Ill., assignors to Abbott Laboratories, Abbott Park, Ill.

Continuation-in-part of Ser. No. 60,784, Jun. 10, 1987, abandoned, which is a continuation-in-part of Ser. No. 12,970, Feb. 10, 1987, abandoned. This application Jan. 11, 1988, Ser. No. 138,073

Int. Cl.[4] A61K *31/38, 31/34*; C07D *209/04, 333/52*

U.S. Cl. 514—443 **25 Claims**

1. A compound of the formula:



wherein R_1 is (1) hydrogen, (2) C_1 to C_4 alkyl, (3) C_2 to C_4 alkenyl, or (4) NR_2R_3, wherein R_2 and R_3 are independently selected from (1) hydrogen, (2) C_1 to C_4 alkyl and (3) hydroxyl, but R_2 and R_3 are not simultaneously hydroxyl;

wherein X is oxygen, sulfur, SO_2, or NR_4, wherein R_4 is (1) hydrogen, (2) C_1 to C_6 alkyl, (3) C_1 to C_6 alkoyl, (4) aroyl, or (5) alkylsulfonyl;

A is selected from C_1 to C_6 alkylene and C_2 to C_6 alkenylene;

n is 1–5;

Y is selected independently at each occurrence from (1) hydrogen, (2) halogen, (3) hydroxy, (4) cyano, (5) halo-substituted alkyl, (6) C_1 to C_{12} alkyl, (7) C_2 to C_{12} alkenyl, (8) C_1 to C_{12} alkoxy, (9) C_3 to C_8 cycloalkyl, (10) C_1-C_8 thioalkyl, (11) aryl, (12) aryloxy, (13) aroyl, (14) C_1 to C_{12} arylalkyl, (15) C_2 to C_{12} arylalkenyl, (16) C_1 to C_{12} arylalkoxy, (17) C_1 to C_{12} arylthioalkoxy, and substituted derivatives of (18) aryl, (19) aryloxy, (20) aroyl, (21) C_1 to C_{12} arylalkyl, (22) C_2 to C_{12} arylalkenyl, (23) C_1 to C_{12} arylalkoxy, or (24) C_1 to C_{12} arylthioalkoxy, wherein substituents are selected from halo, nitro, cyano, C_1 to C_{12} alkyl, alkoxy, and halosubstituted alkyl;

Z is oxygen or sulfur;

and M is hydrogen, a pharmaceutically acceptable cation, aroyl, or C_1 to C_{12} alkoyl.

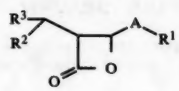
4,873,260

TREATMENT OF DIABETIC KETOACIDOSIS

Alfred W. Alberts, Princeton, N.J., and Michael D. Greenspan, New York, N.Y., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Jun. 27, 1988, Ser. No. 212,769
Int. Cl.[4] A61K *31/335*
U.S. Cl. 514—449 **9 Claims**

1. A method for the treatment of ketoacidosis which comprises administering to a subject in a ketoacidotic state an effective amount of a compound represented by the following structural formula (I):



(I)

wherein:

R^1 is selected from
(1) hydrogen,
(2) hydroxy,
(3) C_{1-6} alkoxy
(4) phenyl,
(5) COR^4,

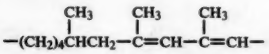
R^4 is
(1) hydroxy,
(2) C_{1-6} alkoxy,
(3) substituted C_{1-6} alkoxy in which the substituent is a phenyl group,
(4) amino,
(5) C_{1-6} alkylamino,
(6) substituted C_{1-6} alkylamino in which the substituent is a hydroxy group,
(7) phenylamino,
(8) substituted phenyl amino in which the substituent is a halogen; and
(9) 2-thiopyridine;

R^2 is selected from
(1) hydrogen,
(2) halogen,
(3) cyano,
(4) azido,
(5) C_{1-6} alkylcarbonylthio,
(6) C_{1-6} alkyl
(7) C_{1-6} alkoxy,
(8) C_{2-6} alkenyloxy,
(9) formyloxy,
(10) C_{1-6} alkylcarbonyloxy,
(11) carboxy C_{1-6} alkylcarbonyloxy,
(12) anisyldiphenylmethyloxy,
(13) C_{1-6} alkylsulfonyloxy,
(14) aminocarbonyloxy, and
(15) C_{1-6} alkylaminocarbonyloxy;

R^3 is selected from
(1) hydrogen,
(2) C_{1-6} alkyl,
(3) C_{1-6} alkenyl,
(4) phenyl, or

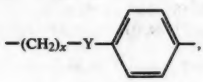
R^2 and R^3 when taken together with the carbon atom to which the are attached form C_{3-6} carbocyclic ring;

A is selected from



(I)

(2) C_{6-17} alkylene,
(3) substituted C_{6-17} alkylene in which the one or two substituents are
(a) oxo,
(b) epoxy,
(c) geminal dihydroxy,
(d) C_{1-6} alkoxy, and
(e) 4-bromophenylhydrazono;
(4) monounsaturated C_{6-17} alkylene, and
(5) substituted monounsaturated C_{6-17} alkylene in which the one or two substituents are
(a) oxo,
(b) epoxy,
(c) geminal dihydroxy,
(d) C_{1-6} alkoxy, and
(e) 4-bromophenylhydrazono;
(6) C_{7-16} aralkylene, wherein the alkyl chain is interupted by a 1,2-, 1,3-, or 1,4-phenylene moiety,
(7) C_{6-18} alkylene, straight or branched chain, interupted by an oxygen, sulfur or sulfoxide moiety,
(8) a group of the structure



where x is 1–4 and Y is O, S, or SO; the broken line indicates a connecting single or double bond; or a pharmaceutically acceptable salt thereof.

4,873,261

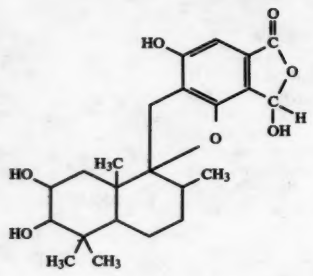
PHARMACEUTICAL COMPOSITION FOR TREATING ULCERATIVE LARGE INTESTINAL DISEASE

Wasei Miyazaki, and Yasuhiko Inoue, both of Tokushima, Japan, assignors to Otsuka Pharmaceutical Co., Ltd., Tokyo, Japan

Filed Feb. 10, 1988, Ser. No. 154,205
Claims priority, application Japan, Feb. 13, 1987, 62-32129
Int. Cl.[4] A61K *31/34*
U.S. Cl. 514—462 **2 Claims**

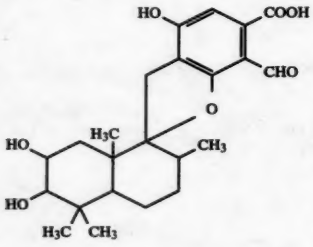
1. A method for treating ulcerative large intestinal diseases, which comprises administering to a patient suffering from an ulcerative large intestinal disease a pharmaceutical composi-

tion containing at least one of the analogous compounds of sesquiterpene or a salt thereof represented by the formula, selected from the group consisting of the formula (1),



(1)

and the formula (2),



(2)

and a pharmaceutically acceptable carrier in a daily dose of from about 0.1 to 50 mg/kg of body weight/day based on the analogous compounds of sesquiterpene or a salt thereof.

4,873,262

8-SUBSTITUTED 2-AMINOTETRALINS

Bodo Junge, Wuppertal; Bernd Richter, Bergisch Gladbach; Thomas Glaser, Roestrath; Jörg Traber, Lohmar, all of Fed. Rep. of Germany, and George S. Allen, Nashville, Tenn., assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

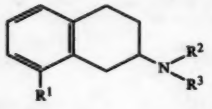
Filed Dec. 15, 1987, Ser. No. 132,372

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1986, 3643899; Jun. 15, 1987, 3719924

Int. Cl.[4] A61K *31/24, 31/275;* **C07C** *101/00, 121/00*

U.S. Cl. 514—510 **7 Claims**

1. An 8-substituted 2-aminotetralin of the formula



in which

R^1 represents cyano or —COR^6,

R^6 denotes hydrogen, hydroxyl, amino, alkoxy, aryloxy or aralkoxy,

R^2 represents hydrogen or alkyl, and

R^3 represents alkyl,

or a salt thereof.

7. A method of treating a disorder of the central nervous system, the cardiovascular system or the intestinal tract comprising administering to a patient suffering therefrom an amount effective therefor of a compound or salt thereof according to claim 1.

4,873,263

RECTALLY ABSORBABLE FORM OF L-DOPA

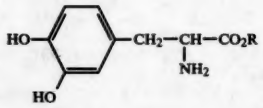
A. J. Repta, Lawrence, Kans., assignor to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 39,406, Apr. 17, 1987, Pat. No. 4,771,073, which is a continuation-in-part of Ser. No. 814,861, Dec. 30, 1985, Pat. No. 4,663,349. This application Sep. 9, 1988, Ser. No. 242,246

Int. Cl.[4] A61K *31/24, 31/195*

U.S. Cl. 514—535 **28 Claims**

1. A pharmaceutical composition for enhancing rectal absorption of L-dopa by administering a formulation comprising a therapeutically effective dosage amount of an ester of L-dopa of the structural formula:



wherein R=alkyl(C_1–C_{20}), aryl(C_6–C_9), substituted and unsubstituted mono, di or polyhydroxyalkyl(C_1–C_{20}); substituted and unsubstituted aralkyl(C_7–C_{20}) and pharmaceutically acceptable organic or inorganic counterion salts.

4,873,264

NOVEL PESTICIDAL 1-(ALKYL-PHENOXY-ARYL)-3-BENZOYL UREAS AND PROCESS FOR PREPARATION

David T. Chou, Raleigh, and Paul A. Cain, Cary, both of N.C., assignors to Rhone-Poulenc Nederlands B.V., Amstelveen, Netherlands

Continuation of Ser. No. 495,331, May 20, 1983, abandoned, which is a continuation-in-part of Ser. No. 393,553, Jun. 30, 1982, abandoned. This application Mar. 7, 1988, Ser. No. 168,625

Int. Cl.[4] A01N *47/34;* **C07C** *157/12, 127/22*

U.S. Cl. 514—594 **6 Claims**

1. A compound having the formula 1-[4-(2,4-dimethylphenoxy)-3,6-dimethyl-5-chlorophenyl]-3-(2-chlorobenzoyl) urea.

2. A compound having the formula 1-[4-(2,4-dimethylphenoxy-)-3,6-dimethyl-5-chlorophenyl]-3-(2,6-difluorobenzoyl) urea.

4,873,265

ANTI-INFECTIVE METHODS AND COMPOSITIONS

Steven T. Blackman, New York, N.Y., assignor to Thomes Pharmacal Co., Inc., Rokonkoma, N.Y.

Filed Jul. 14, 1988, Ser. No. 218,956

Int. Cl.[4] A61K *31/135, 31/52*

U.S. Cl. 514—651 **14 Claims**

1. A method of providing local antimycotic treatment to a human or animal tissue area, in need thereof, comprising applying to said tissue area of an effective amount of a composition containing (a) from about 0.5 to about 5.0% by weight of an antihistaminic agent selected from the group consisting of ethanolamine derivatives and pharmaceutically acceptable salts thereof, and (b) a pharmaceutically acceptable topical vehicle.

4,873,266

MENTHONE ENHANCEMENT OF TRANSDERMAL DRUG DELIVERY

Thomas W. Leonard; Karol Kay Mikula, both of Clinton, N.Y., and Marcia S. Schlesinger, Middlesex, N.J., assignors to American Home Products Corp., New York, N.Y.

Filed Jan. 16, 1987, Ser. No. 3,977
Int. Cl.[4] A61K *31/12, 31/135*
U.S. Cl. 514—653 2 Claims

1. A topical composition for the transdermal delivery of physiologically active agents to mammals by topical administration comprising an effective amount of a systemically active, water soluble or solubilizable drug, a percutaneous transfer enhancing amount of 1-menthone and a pharmaceutically acceptable vehicle comprising at least one pharmaceutically acceptable solvent or solubilizer for said 1-menthone, wherein said water soluble or solubilizable drug is albuterol.

4,873,267

PROCESS FOR THE PRODUCTION OF METHANOL AND A COMPOSITION SUITABLE FOR USE AS A CATALYST IN SAID PROCESS

Swan T. Sie; Eit Drent, and Willem W. Jager, all of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Apr. 25, 1988, Ser. No. 185,622
Claims priority, application United Kingdom, Apr. 29, 1987, 8710172
Int. Cl.[4] C07C *27/06, 31/04*
U.S. Cl. 518—700 11 Claims

1. A process for the production of methanol which comprises contacting a gaseous mixture comprising carbon monoxide and hydrogen with a catalytic system prepared by combining the following components:

component (a): a nickel salt of a carboxylic acid having a pK_a, measured in aqueous solution at 25° C., of more than 4.76.,

component (b): an alcohol; and

component (c): hydride selected from the group consisting of a hydride of an alkali metal, a hydride of an alkaline earth metal, and a mixture thereof.

4,873,268

DIGESTION PRODUCTS OF POLYALKYLENE TEREPHTHALATE POLYMERS AND POLYCARBOXYLIC ACID-CONTAINING POLYOLS AND POLYMERIC FOAMS OBTAINED THEREFROM

Richard K. Hallmark, Largo; Michael J. Skowronski, Clearwater, and William D. Stephens, Pinellas Park, all of Fla., assignors to Sloss Industries Corporation, Birmingham, Ala.

Continuation of Ser. No. 713,201, Mar. 18, 1985, which is a continuation of Ser. No. 582,348, Feb. 22, 1984, Pat. No. 4,539,341. This application Oct. 14, 1986, Ser. No. 917,887
Int. Cl.[4] C08G *18/14*
U.S. Cl. 521—48.5 22 Claims

1. A polyester polyol mixture comprising the fluid reaction product obtained by digesting polyalkylene terephthalate in the presence of a transesterification catalyst with a digesting medium comprising a polycarboxylic acid component-containing polyol derived from the polycarboxylic acid component and a digesting polyol component, wherein the polycarboxylic acid component has ring units with two

groups on adjacent or alternate ring positions, the content of the digesting polyol component and ring unit content of the polycarboxylic acid component being sufficient for improved storage stability of the digestion product.

4,873,269

RESINOUS COMPOSITIONS FOR DENTURE BASE

Ryoji Nakazato, Tokorozawa, Japan, assignor to G-C Dental Industrial Corp., Tokyo, Japan

Filed Jul. 7, 1987, Ser. No. 70,701
Claims priority, application Japan, Jul. 21, 1986, 61-178958
Int. Cl.[4] A61K *6/08*
U.S. Cl. 523—115 20 Claims

1. A resinous composition for denture base, having improved performance suitable for microwave curing, which comprises in combination a two component composition comprised of:

(i) a powdery component containing as the main constituents a methacrylate ester polymer having a mean particle size of 50 to 120 microns, a barbituric acid derivative and an organic peroxide, and

(ii) a liquid component containing as the main constituents a monomethacrylate ester monomer, a cross-linking agent and a quaternary ammonium chloride.

4,873,270

POLYURETHANE-CARBOHYDRATE-BASED SUBSTANCES WHICH CAN BE CALENDERED TO PRODUCE BIODEGRADABLE MATERIALS

Jean-Marc Aime, Creil; Georges Mention, Compiegne, and André Thouzeau, Paris, all of France, assignors to Charbonnages De France, Paris, France

Filed Feb. 9, 1988, Ser. No. 153,889
Claims priority, application France, Feb. 10, 1987, 87 01623
Int. Cl.[4] C08J *3/04;* C08L *3/04*
U.S. Cl. 523—128 19 Claims

1. Polyurethane-based substance which can be calendered to produce a biodegradable material, comprising a homogeneous mixture of a thermoplastic polyurethane resin, a carbohydrate, at least one second thermoplastic polymer which is miscible in the molten state with said polyurethane rein and which gives the mixture the ability to be calendered and which comprises polyvinylchloride, and at least one third biodegradable polymer different from said polyurethane resin and which is a biodegradable aliphatic polyester.

19. A biodegradable homogeneous plastic composition comprising a thermoplastic polyurethane resin, an amount sufficient of a carbohydrate in fine particle form to make such composition in film form biodegradable, and an amount sufficient to make said composition calenderable of at least one second thermoplastic polymer which is miscible in the molten state with said thermoplastic polyurethane resin, said second thermoplastic polymer comprising PVC.

4,873,271

GAMMA RADIATION RSISTANT POLYCARBONATE COMPOSITIONS

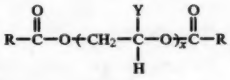
Charles E. Lundy, and Sivaram Krishnan, both of Pittsburgh, Pa., assignors to Mobay Corporation, Pittsburgh, Pa.

Filed Apr. 25, 1989, Ser. No. 342,918
Int. Cl.[4] C08K *5/10*
U.S. Cl. 523—136 7 Claims

1. A thermoplastic molding composition comprising

(i) an aromatic polycarbonate resin and about 0.05 to 5.0% of

(ii) a stabilizing agent conforming to



wherein R denotes a C_1–C_{20} alkyl, aryl or alkylaryl radical, Y denotes a C_1–C_6 alkyl or a hydrogen atom and X is 1 to 40.

4,873,272

POLYETHER END-BLOCKED WITH HYDROLYZABLE SILYL GROUPS, METHOD OF MANUFACTURING AND ROOM TEMPERATURE CURABLE COMPOSITION USING THE POLYETHER

Chiyuki Shimizu, and Tamio Yoshida, both of Ohta, Japan, assignors to Toshiba Silicone Co., Ltd., Japan

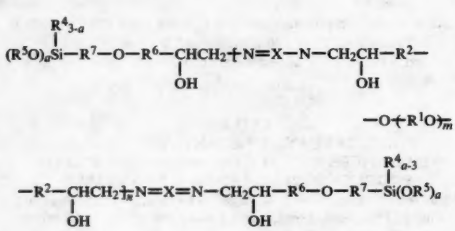
Filed Nov. 9, 1987, Ser. No. 118,505

Claims priority, application Japan, Nov. 17, 1986, 61-273519; Nov. 17, 1986, 61-273520

Int. Cl.[4] C08K 9/06

U.S. Cl. 523—212 9 Claims

1. A polyether having molecular weight from 1000 to 50,000, end-blocked with hydrolyzable silyl groups and represented by the general formula:



where R^1, R^2, R^6 and R^7 individually represent a divalent hydrocarbon group, R^4 represents a monovalent hydrocarbon group, R^5 represents an alkyl group with 1 to 6 carbon atoms, a represents a number from 1 to 3, m represents a number from 10 to 500, n represents a number of 1 or greater and —N=X-=N— represents a residue group of a diimino heterocyclic compound selected from piperazine, 2,5-dimethyl piperazine, 1,4-diimino cyclopentane, perhydrophenazine, perhydropyrimidine, perhydro-1,3,5-oxadiazine or perhydro-1,3,5-thiadiazine.

4,873,273

EPOXIDE COATING COMPOSITION

John L. Allan; Jeffery J. Boettcher, both of Neenah, Wis.; Norman G. Gaylord, New Providence, N.J., and Leon Katz, Norwalk, Conn., assignors to James River-Norwalk, Inc., Norwalk, Conn.

Continuation-in-part of Ser. No. 93,105, Aug. 31, 1987, abandoned, which is a division of Ser. No. 841,938, Mar. 20, 1986, Pat. No. 4,740,392. This application Jun. 7, 1988, Ser. No. 203,711

Int. Cl.[4] C08K 3/20, 5/09

U.S. Cl. 523—407 7 Claims

1. A one part self-curing thermosetting resin composition having extended pot life which consists of the following components:

(a) a polymer or copolymer containing carboxylic acid groupings;

(b) an epoxy-compound containing on average more than one epoxide grouping;

(c) a quaternary ammonium or quaternary phosphonium compound; and

(d) a monomeric acid selected from the group consisting of hydrochloric acid, sulfuric acid, and organic carboxylic acids containing 1 to 3 carboxylic acid groupings per molecule and their anhydrides,

wherein the mole ratio of expoxide groupings in the epoxy component (b) to carboxylic acid groupings in the polymeric component (a) is in the range of 0.5 to 5; the mole ratio of the quaternary ammonium or quaternary phosphonium moiety of the base to carboxylic acid groupings in the polymeric component is in the range of 0.05 to 2, and said monomeric acid component (d) is present in the composition in an amount in the range of 0.02 to 5 moles for each mole of carboxylic acid grouping contained in component (a).

4,873,274

IN-MOLD COATING POWDERS WITH TWO INITIATORS OR 1,1-DI(T-BUTYLPEROXY)-3,3,5-TRIMETHYLCYCLOHEXANE AS A SINGLE INITIATOR

Frederick L. Cummings, Reading, and Glenn D. Correll, Birdsboro, both of Pa., assignors to Morton Thiokol, Inc., Chicago, Ill.

Filed Sep. 24, 1987, Ser. No. 100,675

Int. Cl.[4] C08L 67/06

U.S. Cl. 523—500 30 Claims

1. An unsaturated polyester resin coating powder composition consisting essentially of:

A. from about 20 to 100 parts by weight of at least one unsaturated polyester resin;

B. from 0 to about 80 parts by weight of at least one copolymerizable second resin, wherein the total proportion of resin is 100 parts by weight;

C. from about 0.01 to about 2 parts by weight per 100 parts resin by weight of a fast initiator having a ten hour half-life at not more than 82° C.; and

D. from about 3 to about 7 parts by weight per 100 parts resin by weight of a slow initiator having a ten hour half-life at about 91° C. or more.

4,873,275

FLOW RESISTANT ASPHALT PAVING BINDER

Lyle E. Moran, Sarnia, Canada, and Lawrence G. Kaufman, Somerville, N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation-in-part of Ser. No. 21,189, Mar. 3, 1987, abandoned. This application Dec. 18, 1987, Ser. No. 134,954

Int. Cl.[4] C08L 95/00

U.S. Cl. 524—64 11 Claims

1. A storage stable and creep resistant asphalt paving binder which comprises

(a) an asphalt having about 7 wt. % or less asphaltenes, and

(b) from about 3.5 to about 10 wt. % of a copolymer consisting essentially of ethylene with at least one compound selected from the group of vinyl acetate, alkyl acrylate or alkyl methacrylate, wherein said copolymer has a melt index of from about 0.3 to about 20 g/10 mins. and contains from about 70 to about 97 wt. % ethylene.

4,873,276

POLYPHENYLENE ETHER/POLYAMIDE BLENDS HAVING MPROVED PHYSICAL PROPERTIES

Susumi Fujii, Ibaragi; Hiromi Ishida; Masataka Morioka, both of Tochigi; Akihiro Saito, Utsunomiya, all of Japan, and Roelof van der Meer, Halsteren, Netherlands, assignors to General Electric Company, Selkirk, N.Y.

Filed Mar. 6, 1987, Ser. No. 22,836

Claims priority, application Japan, Mar. 7, 1986, 61-48504; Apr. 7, 1986, 61-78383; Apr. 22, 1986, 61-91371

Int. Cl.[4] C08K 5/51; C08L 71/04, 77/00

U.S. Cl. 524—153 27 Claims

1. A resin composition comprising:

(a) a polyphenylene ether resin;

(b) a polyamide resin in which the amount of terminal amino group is greater than the amount of terminal carboxyl group; and

(c) a compatibilizer compound for (a) and (b).

4,873,277

AROMATIC CARBONATE RESIN EXHIBITING IMPROVED IMPACT PROPERTIES

Omar M. Boutni, Mt. Vernon, Ind., assignor to General Electric Company, Mt. Vernon, Ind.

Filed Oct. 31, 1986, Ser. No. 925,681
Int. Cl.[4] C08K 5/41
U.S. Cl. 524—166 8 Claims

1. A composition comprising

(a) an aromatic carbonate resin;

(b) about 1 to 10 weight percent of a polyolefin based on the weight of (a) and (b)

(c) an amount effective to improve the impact properties of (a) and (b) of an aliphatic sulfonate wherein the amount of aliphatic sulfonate is from about 0.5 to about 2.5 weight percent based upon the total amounts of aliphatic sulfonate and aromatic carbonate.

4,873,278

INHIBITION OF IRRADIATION YELLOWING IN POLYSULFONE COMPOSITIONS

Linda H. Nelson, Evansville, Ind., assignor to General Electric Company, Mt. Vernon, Ind.

Filed Nov. 14, 1986, Ser. No. 930,518
Int. Cl.[4] C08K 5/05, 5/13, 5/02, 5/03
U.S. Cl. 524—380 9 Claims

1. A radiation sterilized polysulfone resin composition exhibiting improved color properties comprised of: (i) at least one polysulfone resin; and (ii) an amount effective to inhibit or diminish yellowing of said polysulfone resin upon exposure to sterilizing radiation of at least one stabilizing alcohol compound of 2 to about 50 carbon atoms.

4,873,279

COPOLYESTER-CARBONATE AND POLYESTER RESIN BLENDS EXHIBITING IMPROVED COLOR PROPERTIES

Linda H. Nelson, Evansville, Ind., assignor to General Electric Company, Mt. Vernon, Ind.

Filed Dec. 22, 1986, Ser. No. 944,036
Int. Cl.[4] C08K 5/05, 5/15
U.S. Cl. 524—384 24 Claims

1. A resinous composition comprising:

(i) at least one copolyester-carbonate resin;

(ii) at least one polyester resin; and

(iii) a minor amount of a mixture of at least one polyol and at least one epoxide, wherein said polyol is represented by the formula

$$R^4\text{—(OH)}_r$$

wherein R^4 is selected from aliphatic hydrocarbon moieties, substituted aliphatic hydrocarbon moieties, aliphatic aromatic hydrocarbon moieties, or substituted aliphatic aromatic hydrocarbon moieties, with the proviso that if R^4 is an aliphatic aromatic or substituted aliphatic aromatic hydrocarbon moiety the hydroxyl radicals are present only on the aliphatic portion thereof; and

r is a positive integer having a value of from 2 up to the number of replaceable hydrogen atoms present on R^4 wherein said amount of (iii) is an anti-yellowing effective amount.

4,873,280

WATER CLARIFICATION PROCESS AND COMPOSITION AND METHOD

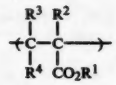
Stephan J. Allenson, Richmond, Tex., assignor to Nalco Chemical Company, Naperville, Ill.

Continuation of Ser. No. 927,568, Jan. 6, 1986, abandoned. This application Mar. 2, 1989, Ser. No. 317,763
Int. Cl.[4] C08K 3/10
U.S. Cl. 524—437 16 Claims

1. A method of preparing an aqueous blend of alkali metal aluminate and anionic vinyl polymer comprising:

admixing an aqueous solution of alkali metal aluminate having a pH of at least 10 with a water-external emulsion containing in the dispersed-phase an anionic vinyl polymer,

wherein said anionic vinyl polymer is comprised of at least 90 weight percent of units having the Formula I of



wherein R^1 is hydrogen, alkali metal cation, ammonia cation, or alkyl of 1 to 16 carbon atoms, and R^2, R^3, and R^4 are each independently hydrogen, alkyl of 1 to 16 carbon atoms, or a carboxylic acid moiety or water soluble salt thereof, provided said polymer contains no more than 70 weight percent of units of said Formula I comprised of a carboxylic acid or water soluble salt thereof moiety which contain less than 10 total carbon atoms,

wherein said anionic vinyl polymer has an average molecular weight of at least 500,000,

wherein the weight ratio of said alkali metal aluminate and said anionic vinyl polymer is from 5 to 175 alkali metal aluminate per part anionic vinyl polymer,

wherein the admixing is conducted under agitation while the pH of the admixture is maintained at at least 10 and the admixture does not gel.

4,873,281

STABLE WATER-SOLUBILIZED POLYESTER/ACRYLIC RESINS MADE UTILIZING HYDROCARBON WAXES AND LOW ACID VALUE POLYESTERS

Rudolf Maska, Pittsburgh, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sep. 29, 1987, Ser. No. 102,210
Int. Cl.[4] C08F 2/16
U.S. Cl. 524—457 17 Claims

1. A water-solubilized resin composition prepared by combining a solubilizing agent and water with a composition comprising:

(I) a saturated polyester polymer having an acid value on solids of from 0 to 30 when the weight average molecular weight of said polyester polymer ranges from 500 to 5,000, and

(II) a vinyl polymer derived from a vinyl monomer composition comprising 3 to 50 percent by weight of an ethylenically unsaturated carboxylic acid provided that said vinyl monomer composition has been addition polymerized in solution in the presence of from 1.0 to 50 percent by weight of a hydrocarbon wax based on the total weight of said vinyl monomer composition.

4,873,282

POLYACETAL RESIN COMPOSITION

Hiroshi Yui; Michiya Okamura; Masakazu Ikeda, and Norio Matsuo, all of Mie, Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Filed Apr. 29, 1988, Ser. No. 187,843

Claims priority, application Japan, May 15, 1987, 62-118168; May 15, 1987, 62-118169

Int. Cl.[4] C08L 59/00; C08K 3/04

U.S. Cl. 524—496 12 Claims

1. A polyacetal resin composition, comprising:

(a) from 60 to 94 parts by weight of a polyacetal, (b) from 4 to 30 parts by weight of an ethylene homopolymer or copolymer having a density of from 0.945 to 0.98 g/cm^3 and a melt flow rate of from 2 to 8 g/10 min, and (c) from 2 to 10 parts by weight of a carbon black selected from furnace black, acetylene black, thermal black and channel black, the amount of each component being based on 100 parts by weight of the total amount of components (a), (b), and (c) in the composition, the ratio of the melt flow rate of the poylacetal component (a) to component (b) ranging from 0.5 to 15.

4,873,283

MOLDED OR FORMED POLY(ARYLENE THIOETHER-KETONE) ARTICLES

Yoshikatsu Satake; Yo Iizuka; Toshitaka Kouyama; Takayuki Katto, and Zenya Shiiki, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo K.K., Tokyo, Japan

Filed May 12, 1988, Ser. No. 194,017

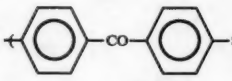
Claims priority, application Japan, May 15, 1987, 62-118620; Jul. 21, 1987, 62-181970; May 7, 1988, 63-109916

Int. Cl.[4] C08F 82/80

U.S. Cl. 524—520 16 Claims

1. A molded or formed poly(arylene thioether-ketone) article made of a thermoplastic material which comprises:

(A) 100 parts by weight of a melt-stable poly(arylene thioether-ketone) having predominant recurring units of the formula



wherein the —CO— and—S— are in the para position to each other, and having the following physical properties (a)–(c):

(a) melting point, Tm being 310°–380° C.;

(b) residual melt crystallization enthalpy, ΔHmc 420° C./10 min) being at least 10 J/g, and melt crystallization temperature, Tmc (420° C./10 min) being at least 210° C., wherein Δ Hmc (420° C./10 min) and Tmc (420° C./10 min) are determined by a differential scanning colorimeter at a cooling rate of 10° C./min, after the poly(arylene thioether-ketone) is held at 50° C. for 5 minutes in an inert gas atmosphere, heated to 420° C. at a rate of 75° C./min and then held for I0 minutes at 420° C.; and

(c) reduced viscosity being 0.2–2 dl/g as determined by viscosity measurement at 25° C. and a polymer concentration of 0.5g/dl in 98 percent by weight sulfuric acid; and optionally,

(B) at least one component selected from (i) up to 100 arts weight of at least one thermoplastic resin and (ii) up to 300 parts by weight of at least one filler selected from fibrous fillers nd inorganic fillers.

4,873,284

HEAT-CURABLE MOLDING COMPOSITIONS

Peter Ittemann, Ludwigshafen, and Philipp Eisenbarth, Bad Dierkheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

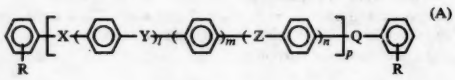
Filed Jan. 20, 1988, Ser. No. 146,232

Claims priority, application Fed. Rep. of Germany, Jan. 23, 1987, 3701900

Int. Cl.[4] C08K 7/06, 7/14; C08L 33/24, 49/00

U.S. Cl. 524—548 5 Claims

1. A heat-curable resin system, comprising a bismaleimide monomer and a comonomer selected from the group consisting of:



(A)

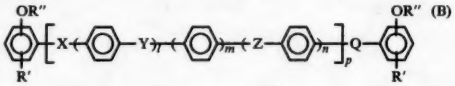
wherein X, Y, Z, and Q are selected from the group consisting of —CO—, —O—, —SO_2—, —CH_2O—, and —C(R′-)$_2$— wherein R′ is a C_1–C_6 alkyl radical; wherein l and n may be 0 or 1; wherein m may be 1 or 2;

wherein p can be a whole number between 1 and 10;

wherein

r is an aryl nucleus, which may be substituted with C_1–C_6 alkyl, alkoxy, aryl, halogen, or nitro groups;

wherein R is an alkenyl or alkynyl radical containing from 2 to about 6 carbon atoms; and wherein the comonomer A contains at least 5 aryl nuclei; and



(B)

wherein the symbols have the same meaning as in (A) and wherein R′ and R″ are alkenyl, alkynyl, or H, provided that when R′ is alkenyl or alkynyl, R″ is H, and when R″ is alkenyl or alkynyl, R′ is H.

5. A fiber reinforced, heat-curable prepreg, comprising

(a) reinforcing fibers selected from the group consisting of glass, carbon, aramid, and polyarylene polymers containing interspersed ether, ketone, sulfone, or isopropylidene groups; and

(b) the heat curable resin of claim 1.

4,873,285

POLYESTER GRAFT COPOLYMERS, FLEXIBLE COATING COMPOSITIONS COMPRISING SAME AND BRANCHED POLYESTER MACROMERS FOR PREPARING SAME (III)

Rose A. Ryntz, Midland, Mich., assignor to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Division of Ser. No. 12,131, Feb. 6, 1987, abandoned. This application Aug. 11, 1988, Ser. No. 231,421

Int. Cl.[4] C08L 67/02, 75/06

U.S. Cl. 525—28 27 Claims

1. A solvent based coating composition useful as an automotive coating on metal and plastic substrates comprising:

(A) hydroxy functional polyester graft copolymer which has a number average molecular weight between about 1,300 and about 15,000, a hydroxyl number between about 30 and about 300, and is the reaction product of carbon-car-

bon double bond-reactive monoethylenically unsaturated monomers with hydroxy functional branched polyester macromer having a terminal carbon-carbon double bond, under free radical polymerization reaction conditions, said monomers bearing substantially no functionality which is substantially reactive with hydroxy functionality of said macromer under said reaction conditions and said monomers being polymerized to form a polymeric chain grafted to the macromer by the carbon-carbon double bond, said macromer being the reaction product of: (i) hydroxy functional polyester reactant formed by reacting polyol with a saturated dicarboxylic acid or corresponding anhydrides thereof and having about 0–10 urethane groups per molecule with (ii) halide compound selected from the group consisting of vinyl alkyl halide compound and vinyl aryl halide compound, wherein the reaction of (i) and (ii) takes place under conditions that promote substantially only the reaction between the halide moiety of compound (ii) and the hydroxyl groups of reactant (i) wherein said hydroxy functional polyester reactant and said halide compound are reacted in about 1:1 molar ratio; and

(B) polyfunctional, hydroxy reactive crosslinking agent.

4,873,286

MODIFIED POLYPHENYLENE ETHER-POLYAMIDE COMPOSITIONS AND PROCESS

Robert R. Gallucci, Pittsfield, Mass.; Roelof van der Meer, Bergen op Zoom, Netherlands, and Roger W. Avakian, Brasschaat, Belgium, assignors to General Electric Company, Pittsfield, Mass.

Continuation of Ser. No. 736,490, May 20, 1985, abandoned, which is a continuation-in-part of Ser. No. 612,389, May 21, 1984. This application Apr. 14, 1988, Ser. No. 183,494

Int. Cl.[4] C08L *71/04, 77/00*

U.S. Cl. 525—92 **24 Claims**

1. An improved process for the preparation of polyphenylene ether-polyamide compositions wherein the improvement comprises precompounding from about 0.05 to about 4% by weight, based on the total composition, of one or more aliphatic polycarboxylic acid represented by the formula:

$$(R^{I}O)_m R(COOR^{II})_n(CONR^{III}R^{IV})_s$$

or derivatives thereof wherein R is a linear or branched chain, saturated aliphatic hydrocarbon of from 2 to 20 carbon atoms; R^{I} is selected from the group consisting of hydrogen or an alkyl, aryl, acyl or carbonyl dioxy group of from 1 to 10 carbon atoms; each R^{II} is independently selected from the group consisting of hydrogen or an alkyl or aryl group of from 1 to 20 carbon atoms; each R^{III} and R^{IV} is independently selected from the group consisting of hydrogen or an alkyl or aryl group of from 1 to 10 carbon atoms; m is equal to 1 and (n+s) is greater than or equal to 2, and n and s are each greater than or equal to 0; and wherein (OR^{I}) is alpha or beta to a carbonyl group and at least 2 carbonyl groups are separated by 2 to 6 carbon atoms, with the polyphenylene ether and a modifier resin prior to compounding with the polyamide in order to enhance the impact strength of the final composition; said modifier resin having been derived from vinyl aromatic monomers, the blending ratio of polyphenylene ether to polyamide being from 5 to 95 percent by weight of the former to 95 to 5 percent by weight of the latter.

4,873,287

FLAME RETARDANT TERNARY BLENDS OF POLYETHERIMIDE, POLYPHENYLENE ETHER AND BLOCK COPOLYMER OF A VINYL AROMATIC HYDROCARBON AND AN ALKENE COMPOUND

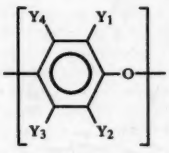
Fred F. Holub, Schenectady; Visvaldis Abolins, Bethlehem, both of N.Y., and John A. Rock, Becket, Mass., assignors to General Electric Company, Pittsfield, Mass.

Filed Dec. 30, 1987, Ser. No. 139,575

Int. Cl.[4] C08L *53/00, 71/04*

U.S. Cl. 525—92 **8 Claims**

1. A ternary polymer blend comprising (a) a polyetherimide; (b) a polyphenylene ether of the structural formula:



wherein the oxygen ether atom of one structural unit is connected to the benzene nucleus of the next adjoining unit, b is a positive integer and is at least 50 and Y_1, Y_2, Y_3 and Y_4, which may be the same or different, are monovalent substituents selected from the group consisting of hydrogen, halogen, hydrocarbon radicals, halo-hydrocarbon radicals having at least two carbon atoms between the halogen atom and the benzene nucleus, hydrocarboxy radicals and halohydrocarboxy radicals having at least two carbon atoms between the halogen atom and the benzene nucleus; and (c) a block copolymer of a vinyl aromatic compound (A) and an alkene compound (B), of the A-B-A type, the center block being of higher molecular weight than that of the combined terminal blocks.

4,873,288

METHOD FOR PREPARATION OF THERMOPLASTIC RESIN COMPOSITION

Masato Komatsu; Isao Baba, both of Saitama; Takashi Mikami, Tokyo; Kiyotada Narukawa, Saitama, and Tsuyoshi Kanai, Kanagawa, all of Japan, assignors to Toa Nenryo Kogyo K.K., Tokyo, Japan

Filed Oct. 4, 1988, Ser. No. 253,178

Claims priority, application Japan, Oct. 7, 1987, 62-253308

Int. Cl.[4] C08L *23/26, 15/02, 23/10*

U.S. Cl. 525—194 **9 Claims**

1. A method for preparation of a thermoplastic resin composition comprising from 80 to 60% by weight of a polyolefin and from 20 to 40% by weight of crosslinked olefin rubber and further comprising halogenated butyl rubber in an amount of from 5 to 30 parts by weight to 100 parts by weight of the total of said polyolefin and said crosslinked olefin rubber, characterized in that:

(a) a first blend of polyolefin and crosslinkable olefin rubber are dynamically heat-treated in the presence of an organic peroxide to form a dynamically vulcanized composition, and

(b) a polyolefin and halogenated butyl rubber and a crosslinking agent for said halogenated butyl are added to said first blend and dynamically heat-treated so as to crosslink said halogenated butyl rubber.

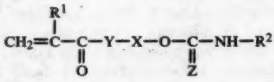
4,873,289

GRAFT POLYMERS AND BLENDS THEREOF WITH POLYAMIDES

Christian Lindner, Koeln; Dieter Wittmann; Ludwig Trabert, both of Krefeld; Carlhans Süling; Herbert Bartl, both of Odenthal, and Karl-Heinz Ott, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 878,278, Jun. 25, 1986, abandoned.
This application Sep. 15, 1988, Ser. No. 246,887
Claims priority, application Fed. Rep. of Germany, Jul. 6, 1985, 3524234
Int. Cl.[4] C08F *265/04*
U.S. Cl. 525—293 19 Claims

1. A graft polymer prepared under free radical conditions from a graft substrate (A) and grafting monomers (B) wherein (A) comprises an elastomer component which is at least one of diene rubbers, ethylene/vinyl acetate copolymers, ethylene/acrylate copolymers, silicone rubbers, or acrylate rubbers which are partly crosslinked to a degree of at least 20% and having an average particle size of 0.05 to 8 μm determined by ultracentrifuge measurement, and a glass transition temperature less than −20° C., and (B) comprises grafting monomers of the formula



(I)

in which

R^1 represents a hydrogen atom or a C_1–C_4-alkyl radical,

R^2 represents a C_1–C_{20}-alkyl or C_6–C_{18}-aryl radical, which is unsubstituted or substituted by alkyl groups or groups containing O or N,

Y represents an —O— or an —NH— group,

X represents a C_2–C_{10}-alkylene radical, and

Z represents O or S; or mixtures thereof with other olefinically unsaturated monomers.

4,873,290

CURE SYSTEM FOR OPEN STEAM CURING OF MINERAL-LOADED CHLOROBUTYL COMPOUNDS

Terry F. Allen, Barberton, and Robert C. Schisler, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Aug. 11, 1988, Ser. No. 231,288
Int. Cl.[4] C08C *19/26, 19/22*
U.S. Cl. 525—337 11 Claims

1. A method for vulcanizing mineral loaded chlorobutyl rubber which comprises (a) mixing chlorobutyl rubber with (1) 25 to about 200 phr of a filler selected from the group consisting of calcium carbonate, magnesium carbonate, magnesium silicate, calcium silicate, aluminum silicate, whiting, pyrogenic silica, hydrated silica, barium sulfate, calcium sulfate, titanium dioxide and mica and (2) a vulcanization agent comprising from about 0.25 to about 10 phr of an alkyl phenol disulfide and from about 0.25 to about 10 phr of a guanidine compound selected from the group consisting of diphenyl guanidine, di-ortho-tolyguanidine, triphenyl guanidine and di-ortho-tolylguanidine salt of dicatechol borate and (b) vulcanizing the resultant mixture by open-steam curing.

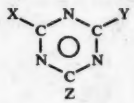
4,873,291

RUBBER VULCANIZATION SYSTEM WITH TRIAZINE COMPOUNDS

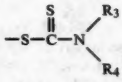
Martin P. Cohen, Akron, and Richard M. D'Sidocky, Ravenna, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 23,328, Mar. 9, 1987, Pat. No. 4,755,320.
This application Dec. 7, 1987, Ser. No. 129,798
Int. Cl.[4] C08F *8/34;* C08C *19/20*
U.S. Cl. 525—348 4 Claims

1. A process for vulcanizing a sulfur vulcanizable rubber selected from the group consisting of styrene/butadiene copolymers, polyisoprene, natural rubber, polybutadiene, ethylene/propylene/diene terpolymers, butadiene/isoprene copolymers, butadiene/isoprene/styrene terpolymers, and blends thereof., said process comprising: (1) admixing an effective amount of a vulcanization system with the vulcanizable rubber, said vulcanization system comprising: (a) a morpholine polysulfide containing from 2 to 5 sulfur atoms and (b) a dithiocarbamyl triazine of the structural formula:



wherein X, Y and Z are the same or different radicals selected from the group consisting of halogen, alkoxy of 1–8 carbon atoms, the radical —S—R wherein R can be from 1–8 carbon atoms, the radical —N—R^1—R^2 wherein R^1 and R^2 can be the same or different radicals of 1 to 8 carbon atoms or R^1 and R^2 taken together complete with the nitrogen atom to which they are attached can form a six membered ring which may contain oxygen as a heteroratom, and a dithiocarbamyl radical of the formula:



wherein R^3 and R^4 are the same or different radicals selected from alkyl of 1 to 8 carbon atoms or R^3 and R^4 taken together with the nitrogen atom to which they are attached form a six membered ring which may contain oxygen as a heteroatom; with the proviso that at least one of X, Y or Z is always a dithiocarbamyl radical and (c) sulfur; wherein the weight percent of component (a) can range from 20 to 98%, the weight percent of component (b) can range from 2 to 40% and the weight percent of component (c) can range from 0 to 70% based on the total weight of the composition with the proviso that the weight percent of (a) is always equal to or greater than the weight percent of (b); (2) heating the admixture to a temperature of from 100°–250° C.

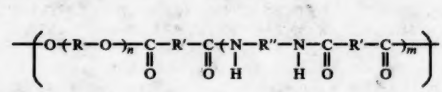
4,873,292

ANTITHROMBOGENIC SYNTHETIC POLYMER AND PROCESS FOR ITS PREPARATION

Naoya Ogata; Kohei Sanui; Nobuhiko Yui; Kazunori Kataoka, all of Tokyo; Teruo Okano, Chiba, and Yasuhisa Sakurai, Tokyo, all of Japan, assignors to Research Development Corporation of Japan, Tokyo, Japan

Continuation-in-part of Ser. No. 814,974, Dec. 31, 1985, abandoned. This application Feb. 9, 1988, Ser. No. 154,003
Int. Cl.[4] C08L *71/02, 77/06*
U.S. Cl. 525—408 8 Claims

1. An antithrombogenic synthetic polymer having repeat structural units represented by the following structural formula consisting of portions I and II:



I II

where R is a straight-chain or branched-chain alkylene group containing from 2 to 4 carbon atoms, R′ is a straight-chain alkylene group containing from 2 to 10 carbon atoms or an aromatic ring group, R″ is a straight-chain or branched-chain alkylene group containing up to 10 carbon atoms, n is an integer which ranges from 13 to 180, and m is an integer ranging from 1 to 400, said polymer having a microdomain structure composed of crystalline phases and amorphous phases, each phase having an average size of between 5 to 10 nm, and the molecular weight of said polymer being in the range of about 10,000 to about 300,000, the portion I being present in an amount ranging from about 13% to about 27% by weight of the polymer.

4,873,293

PARTIALLY HYDROLYZED, POLY(N-ACYL ALKYLENIMINES) IN PERSONAL CARE

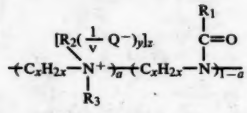
George L. Brode, II, Bridgewater, N.J., and Frederick M. Merritt, II, Lockport, Ill., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Division of Ser. No. 913,407, Sep. 30, 1986, Pat. No. 4,837,005. This application Mar. 9, 1989, Ser. No. 321,149

Int. Cl.[4] C08G *73/00*

U.S. Cl. 525—417 **10 Claims**

1. Nitrogen-substituted, partially hydrolyzed, poly(N-acyl alkylenimine) containing repeating units represented by the structural formula:



wherein a is from about 1 to about 50 mole percent; and wherein for each repeating unit individually:

Q is an anion;

R_1 is hydrogen, alkyl, aryl, aralkyl or alkaryl;

R_2 is hydrogen or a hydrocarbyl-containing group;

R_3 is hydrogen, oxygen or a hydrocarbyl-containing group;

v is equal to the valence of Q;

x is 2 or 3;

y is 0 or 1; and

z is 0 or 1;

provided that:

(1) when R_3 is oxygen then y is 0, R_2 is a hydrocarbyl-containing group and z is 1; and

(2) when R_3 is not oxygen then y is 1; and with the further provisions that:

(3) when all R_2 and R_3 groups are hydrogen then the average value of z per repeat unit is greater than 0 and Q represents a mixture of anions; and

(4) when all z values are 0 then at least one R_3 group is a hydrocarbyl-containing group.

4,873,294

MIXTURE OF CATIONIC BENZENE CARBOXYLATE POLYMERS FROM THE REACTION OF HALOACETYL TERMINATED POLY(ETHER-ESTERS) WITH TERMINAL QUATERNIZING AGENTS

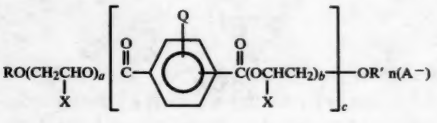
Anthony J. O'Lenick, Jr., Lilburn, and Joseph J. Fanelli, Alpharetta, both of Ga., assignors to GAF Corporation, Wayne, N.J.

Filed Jun. 16, 1988, Ser. No. 207,419

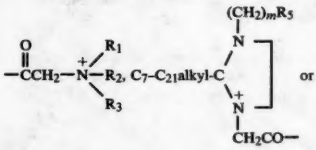
Int. Cl.[4] C08G *63/18, 63/46, 63/66, 63/68*

U.S. Cl. 525—419 **10 Claims**

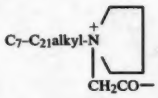
1. A mixture of cationic benzene carboxylate polymers having the formula



wherein R and R′ are selected from the group consisting of alkyl or alkenyl having from 1 to 20 carbon atoms, aryl,



or



with the proviso that at least one of R and R′ is quaternized;

Q is hydrogen, SO_3-alkali metal, SO_3H, COOH or COO-alkali metal, at least 25% of Q in said mixture being hydrogen;

a and b each have a value of from 1 to 200, except that the sum of a+b is at least 25;

X is hydrogen, lower alkyl or mixtures thereof in random or block distribution when a and/or b is greater than 3;

c has a value of from 2 to 10,000;

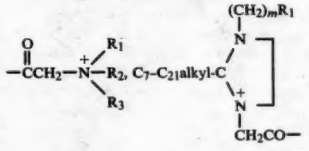
R_1, R_2 and R_3 each contain from 1 to 22 carbon atoms and are alkyl, hydroxy alkyl or alkylamido lower alkyl;

R_5 is

—OH, —$OCOR_1$ or —OR_1;

R_6 is hydrogen or —COR_1;

R_7 is hydrogen, —$(CH_2)_mOCOR_1$, —$(CH_2)_mOR_1$, —$(CH_2)_mNH_2$,



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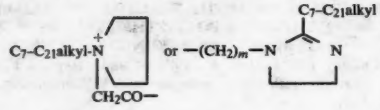


m has a value of from 0 to 3;

A is a halide, sulfonate, sulfate or alkali metal anion and

n has a value equal to the number of quaternized nitrogen atoms in the molecule.

4,873,295

NOVEL POLYETHER SULFONE IMIDE COPOLYMERS

Shigeru Kurosawa, and Kunio Matsuki, both of Ohita, Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

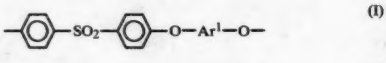
Continuation of Ser. No. 729,077, Apr. 30, 1985, abandoned, which is a continuation of Ser. No. 573,790, Jan. 25, 1984, abandoned. This application Jan. 27, 1986, Ser. No. 822,934

Claims priority, application Japan, Jan. 25, 1983, 58-9426

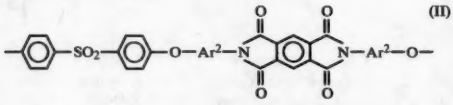
Int. Cl.[4] C08G *75/23*

U.S. Cl. 525—420 **28 Claims**

1. A copolymer produced by treating a polyimide with an excess of an end-capping agent, wherein said polyimide is composed of recurring units of the following formulae (I) and (II):



(I)



(II)

wherein Ar^1 represents a residue of a dihydric phenol, and Ar^2 represents a residue of an aminophenol and wherein said end-capping agent is a primary aromatic amine or an aromatic ortho-dicarboxylic anhydride.

4,873,296

POLYAMIDE POLYETHYLENE GLYCOLPOLYAMIDE BLOCK COPOLYMER

Aldemaro Ciaperoni, Bollate; Alberto Cappelli, Cogliate; Francesco D'Andolfo, Cesano Maderno, and Antonio Salan, Saronno, all of Italy, assignors to SNIA Fibre S.p.A., Cesano Maderno, Italy

Filed Dec. 31, 1984, Ser. No. 688,148

Claims priority, application Italy, Dec. 30, 1983, 24455 A/83

Int. Cl.[4] C08G *69/48*

U.S. Cl. 525—434 **9 Claims**

1. A textile fiber or filament made of a linear block copolymer of a regular structure, comprising polycaproamide and polyethylene glycol blocks, said polyethylene glycol blocks being produced from polyethylene glycol having terminal hydroxy or amino groups, said block copolymer comprising two polycaproamide blocks (A) bound to each other through an intermediate polyethyleneglycol block (B) according to a structural scheme (A-B-A).

4,873,297

PROCESS FOR REDUCING THE HALOGEN CONTENT OF HALOGEN-CONTAINING POLYCARBOSILANES AND POLYSILANES

Alfred Rengstl, Reischach, Fed. Rep. of Germany, assignor to Wacker-Chemie GmbH, Munich, Fed. Rep. of Germany

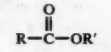
Filed Jun. 13, 1988, Ser. No. 205,874

Claims priority, application Fed. Rep. of Germany, Aug. 11, 1987, 3726702

Int. Cl.[4] C08F *283/00*

U.S. Cl. 525—474 **6 Claims**

1. A process for reducing the halogen content of a polycarbosilane and/or a polysilane having halogen bonded directly to silicon atoms, which comprises contacting a halogen-containing polysilane and/or polycarbosilane with a compound of the formula



where R is selected from the group consisting of hydrogen and an alkyl radical having 1 or 2 carbon atoms and R′ is selected from the group consisting of hydrogen, an alkali metal and an acetyl radical.

4,873,298

POLYSILOXANE GRAFT COPOLYMERS, FLEXIBLE COATING COMPOSITIONS COMPRISING SAME AND BRANCHED POLYSILOXANE MACROMERS FOR PREPARING SAME II

Rose A. Rynitz, Clinton Township, Macomb County, Mich., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

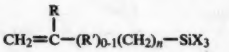
Continuation-in-part of Ser. No. 942,225, Dec. 16, 1986, abandoned. This application Apr. 18, 1988, Ser. No. 182,730

The portion of the term of this patent subsequent to Jun. 16, 2004, has been disclaimed.

Int. Cl.[4] C08F *283/12*

U.S. Cl. 525—479 **26 Claims**

1. Hydroxy functional polysiloxane graft copolymer suitable for flexible, thermosetting coating compositions over metal and plastic substrates, which copolymer has number average molecular weight between about 1,300 and about 15,000, has a hydroxyl number between about 30 and about 300, and is the reaction product of carbon-carbon double bond-reactive monoethylenically unsaturated monomer with hydroxy functional carbon-carbon double bond-bearing branched polysiloxane macromer, under free radical polymerization reaction conditions, sand monomer bearing substantially no functionality which is substantially reactive with hydroxy functionality of said macromer under said reaction conditions, and said macromer being the reaction product of: (i) hydroxy functional polysiloxane reactant having about 0–10 urethane groups per molecule with (ii) silane compound having the general formula:



wherein R is H or an alkyl group with one to three carbon atoms, R′ is a phenylene or substituted phenylene group or a carboxylate group, n being 0 to 3, and X is a halogen, substituted glycol monoether group, alkoxy group or acyloxy group.

4,873,299
BATCHWISE PREPARATION OF CROSSLINKED, FINELY DIVIDED POLYMERS

Bernhard H. Nowakowsky, Ludwigshafen; Juergen Beck, Mannheim; Heinrich Hartmann, Limburgerhof, and Christos Vamvakaris, Kallstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Mar. 20, 1987, Ser. No. 28,449

Claims priority, application Fed. Rep. of Germany, Mar. 21, 1986, 3609545

Int. Cl.[4] C08F *2/18*

U.S. Cl. 526—73 **4 Claims**

1. A process for the batchwise preparation of a crosslinked, finely divided, Water-absorbing polymer, which comprises multistage copolymerization in a batchwise mixing apparatus, with constant thorough mixing in all stages, of 100 parts by weight of a monomer from group (a) or of a monomer mixture from groups

(a) 50–100 parts by weight of acrylic acid or methacrylic acid, each of which has been neutralized with from 0 to 100 mol % of an alkali metal or ammonium base, acrylamide, methacrylamide and N-vinylpyrrolidone,

(b) 0–30 parts by weight of other water-soluble monoethylenically unsaturated monomers and

(c) 0–20 parts by weight of water-insoluble monoethylenically unsaturated monomers

with from 0.01 to 5 parts by weight of, as a crosslinking agent, a monomer containing two or more ethylenically unsaturated double bonds, in 20–80% by weight aqueous solution in the presence of an initiator at above 45° C., in the first stage the aqueous monomer solution being copolymerized at from 45° to 95° C. under from 0.1 to 0.8 bar with removal of some of the water by distillation, in the second stage the copolymerization being completed at from 100° to 170° C. under a pressure up to 8 bar and, in the third stage, after the pressure has been let down, the water content of the resulting finely divided copolymer being reduced to 0.5–10% by weight under reduced pressure at from 70° to 180° C. or under atmospheric pressure at from 120° to 180° C.

4,873,300
PROCESS FOR POLYMERIZING OLEFINS

Ricardo Fuentes, Jr.; Larry A. Meiske, and Gary R. Marchand, all of Baton Rouge, La., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 39,569, Apr. 15, 1987, abandoned, which is a continuation-in-part of Ser. No. 794,218, Oct. 31, 1985, abandoned. This application Mar. 4, 1988, Ser. No. 163,920

Int. Cl.[4] C08F *4/64, 10/00*

U.S. Cl. 526—142 **15 Claims**

1. In the process of polymerizing one or more α-olefins under slurry conditions in the presence of a cocatalyst and a Ziegler-Natta catalyst wherein the transition metal component consists of (1) a hydrocarbon soluble organomagnesium component in an inert hydrocarbon diluent, (2) an aliphatic alcohol, (3) a transition metal (Tm) compound and (4) a reducing halide source in an inert hydrocarbon diluent; wherein the components are employed in quantities so as to provide atomic ratios of Mg:Tm of from about 1:1 to about 40:1; halogen:Mg of from about 6:1 to about 20:1; the improvement which consists of mixing (A) the product resulting from mixing in an inert hydrocarbon diluent, components (1), (2) and (3) with (B) component (4); wherein

(a) the aliphatic alcohol, component (2), is present in a quantity such that for every metal atom present in component (1) there remains on the average of no more than about 0.9 hydrocarbon group attached to the metal atom(s);

(b) the concentration of magnesium in (A) is not greater than about 0.15 molar and the metal concentration in (B), component (4), is not greater than 1.0 molar;

(c) said transition metal compound is represented by the formula $T_mY_nX_{z-n}$ wherein Tm is Ti in its highest stable valence state; Y is oxygen or OR"; R is a hydrocarbyl group having from 1 to about 20 carbon atoms; R" is hydrogen or a hydrocarbyl group having from 1 to about 20 carbon atoms, X is a halogen; z has a value corresponding to the valence of Ti; n has a value of from zero to 4 with the value of z−n being from zero up to a value equal to the valence state of Ti;

(d) said hydrocarbon soluble magnesium component is represented by the formula $R_2Mg.xMeR'_{x'}$ wherein each R is independently a hydrocarbyl group having from 1 to about 20 carbon atoms, each R' is independently hydrogen or a hydrocarbyl or hydrocarbyloxy group having from 1 to about 20 carbon atoms, Me is Al, x has a value sufficient to render the magnesium compound hydrocarbon soluble and x' has a value equal to the valence of Me; and

(e) said reducing halide source is represented by the formula $Al(R^3)_{3-m}X_m$ wherein each R^3 is independently hydrogen or a hydrocarbyl group having from 1 to about 20 carbon atoms, X is a halogen atom and m has a value from 1 to 2;

thereby producing a polymer having a relatively small average particle size of not greater than 200 microns and a relatively narrow particle size distribution having a d-ratio of not greater than 0.5.

4,873,301
OPTICALLY ACTIVE, ETHYLENICALLY UNSATURATED POLYMERS OF AMINO PENICILLANIC ACID COMPOUNDS

Yasushi Saotome, Meguro; Takeo Miyazawa, Minato, and Takeshi Endo, Yokohama, all of Japan, assignors to M & D Research Co., Ltd., Tokyo, Japan

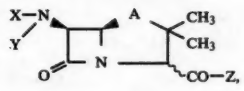
Filed Jan. 25, 1988, Ser. No. 147,722

Claims priority, application Japan, Feb. 26, 1987, 62-43295

Int. Cl.[4] C08F *28/06*

U.S. Cl. 526—257 **14 Claims**

1. An optically active polymer having a number of average molecular weight of at least 3000 and comprising substantially 100 mole % of recurring units formed by cleavage of the ethylenically unsaturated bond of the group X or Z of an optically active, ethylenically unsaturated monomer represented by the following structural formula:



wherein: A stands for S, SO or SO_2, X and Y each stand for a hydrogen atom or a substituent selected from the group consisting of alkyl groups and acyl groups; Z stands for a substituent selected from the group consisting of alkoxy, alkylamino, hydroxyl and silyoxy groupsl; and X and Y can be bonded together to form a ring with the nitrogen atom to which they are bonded or X and Y can be a single group bonded to said nitrogen atom through a double bond, with the proviso that at least one of X and Z is an alkenyl equivalent to said group and that, when X is the alkenyl equivalent it is acryloyl or methacryloyl group and H is a hydrogen atom.

4,873,302
STYRENE-TERMINATED POLYETHERS OF POLYPHENOLS

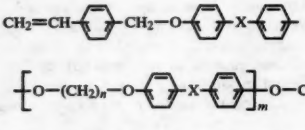
Allyson Beuhler, Indian Head Park, and James A. Wrezel, Buffalo Grove, both of Ill., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Continuation of Ser. No. 895,394, Aug. 11, 1986, abandoned. This application Aug. 29, 1988, Ser. No. 238,996

Int. Cl.[4] C08F *16/12*

U.S. Cl. 526—333 **7 Claims**

1. A poly(vinyl benzyl ether) of a polyphenol which possesses the generic structure:



in which X is selected from the group consisting of S, SO_2, O and straight or branched chain alkyl radicals containing from 1 to about 6 carbon atoms, n is an integer of from 1 to about 8 and m is in a range of from 1 to about 10.

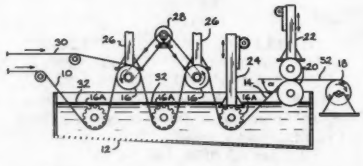
4,873,303
METHOD FOR MAKING A REINFORCED PRODUCT OF BITUMINOUS MATERIAL

Albert J. Blackwood, Perrysburg, and Thomas R. Brady, Granville, both of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Jun. 3, 1986, Ser. No. 870,054

Int. Cl.[4] B05D *3/12, 1/18*

U.S. Cl. 427—365 **5 Claims**



1. The method of making a reinforced product of bituminous material comprising drawing a reinforcing mat through a tank of molten bituminous material to impregnate the mat with the bituminous material, pulling the impregnated mat through metering rolls to establish the final thickness of the reinforced product, establishing the angle of incidence of the impregnated mat with respect to the metering rolls by means of a guide member, and controlling the relative position of the mat within the reinforced product by controlling said angle of incidence.

4,873,304
ORGANOMETALLIC POLYMER

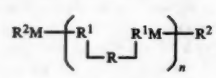
Myron Rosenblum, Lexington, Mass., assignor to Brandeis University, Waltham, Mass.

Filed Nov. 10, 1987, Ser. No. 119,024

Int. Cl.[4] C08G *79/00, 83/00*

U.S. Cl. 528—9 **18 Claims**

1. A polymer represented by



where R^1 represents a ligand selected from the group consisting of cyclopentadienyl, phenyl, and cycloheptatrienyl ligands, R^2 represents a monovalent radical selected from the group consisting of the cyclopentadienyl, η^6-arene and cycloheptatrienyl rings, M represents a transition metal, n is an integer of 2 or more, and R represents a divalent radical bound to the individual metallocene units at two positions.

4,873,305
TIN MONOCHELATE CATALYSIS OF ORGANOPOLYSILOXANE COMPOSITIONS

Jacques Cavezzan; Jean-Marc Frances, both of Villeurbanne, and Claude Millet, Saint-Priest, all of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

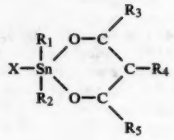
Filed Jun. 27, 1988, Ser. No. 212,184

Claims priority, application France, Jun. 25, 1987, 87 09178

Int. Cl.[4] C08G *77/06*

U.S. Cl. 528—18 **6 Claims**

1. An organopolysiloxane composition of matter curable into elastomeric state, comprising (1) a curable organopolysiloxane base including an organopolysiloxane polymer and a crosslinking agent therefor, and (2) a catalytically effective amount of a monochelate of pentacoordinated tin of valency IV having the formula:



(1)

in which:

the symbols R_1 and R_2, which may be identical or different, are each an optionally substituted, monovalent C_1–C_8 hydrocarbon radical;

the symbols R_3 and R_5, which may be identical or different, are each a radical R_1 or R_2, a hydrogen atom, a C_1–C_5 alkoxy radical or a silyl radical $Si(R_1)_3$;

the symbol R_4 is hydrogen atom, or an optionally halogented C_1–C_8 hydrocarbon radical, with the proviso that R_4 and R_5 may together form, with the carbon atoms from which they depend, a divalent C_5–Clhd 12 cyclic hydrocarbon radical or a substituted such radical bearing at least one chlorine, nitro and/or cyano substituent; and

the symbol X is a monocarboxylate radical of the formula R_6COO wherein R_6 has the same definition as R_1 above

4,873,306
URETHANES CONTAINING FLUORINE AND POLYSILOXANE, PROCESS FOR THEIR PREPARATION AND THEIR USE

Frank Wehowsky, Burgkirchen, and Martin Liebiger, Hofheim am Taunus, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

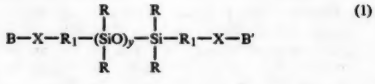
Filed Jul. 5, 1988, Ser. No. 215,202

Claims priority, application Fed. Rep. of Germany, Jul. 7, 1987, 3722375

Int. Cl.[4] C08G *77/04*

U.S. Cl. 528—28 **3 Claims**

1. A urethane containing fluorine and polysiloxane, of the following formula 1

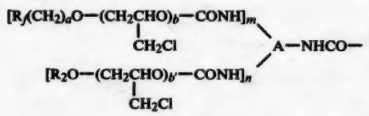


(1)

in which

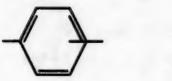
R denotes CH_3 or C_2H_5,

y denotes a number from 5 to 500,
B denotes a radical of the following formula 2



(2)

in which
R_f denotes a perfluoroalkyl radical with 4 to 20 carbon atoms, an ω-H-perfluoroalkyl radical with 4 to 20 carbon atoms, or a radical of the formula $R_fSO_2NR_3$ or of the formula $R_fCH_2CH_2SO_2NR_3$, in which R_f is a perfluoroalkyl radical with 4 to 20 carbon atoms and R_3=H or C_{1-4}-alkyl,
R_2 denotes an alkyl radical with 4 to 20 carbon atoms,
a denotes an integer from 1 to 4,
b denotes a number from 0 to 10,
b′ denotes a number from 0 to 10,
m denotes a number from 1 to 2 and
n denotes a number from 0 to 1, the sum of m+n being not more than 2, and
A denotes a radical corresponding to one of the following formulae (3) to (11)



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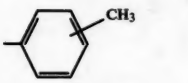

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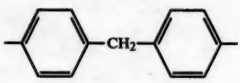

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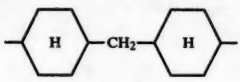

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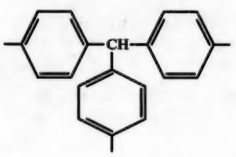

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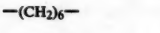

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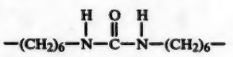

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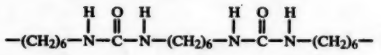
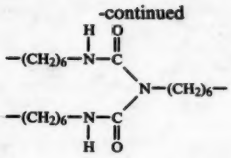


(10)

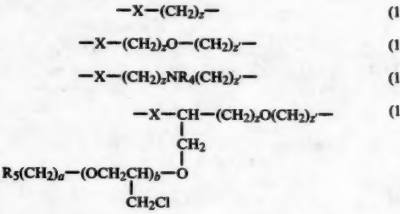
or

-continued



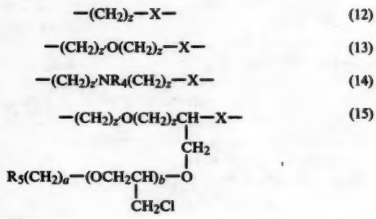
(11)

B′ denotes H or likewise denotes a radical of the formula 2,
X denotes O or NR_4, in which R_4=H or C_{1-4}-alkyl
-X-R_1-denotes a radical corresponding to one of the following formulae (12′) to (15′)



(12′)
(13′)
(14′)
(15′)

in which z and z′ are each an integer from 1 to 10, R_5 has one of the meanings of R_2 or of R_f, and X, R_4, a, and b have the meanings defined previously, and
R_1-X denotes a radical corresponding to one of the following formulae 12 to 15



(12)
(13)
(14)
(15)

in which z, z′, R_5, X, R_4, a, and b have the meanings defined previously.

4,873,307

MONOCOMPONENT POLYURETHANE ADHESIVES

Franco Federici, 49, viale Stelvio, 21052 Busto Arsizio Varese; Franco Pallozzi, 18, via Duca degli Abruzzi, 20059 Vimercate, Milan; Ennio Cozzi, 2, via Novara, 20020 Cantalupo, Milan, and Pietro Turco, 13, via Venezia, 21052 Busto Arsizio, Varese, all of Italy

Continuation of Ser. No. 914,155, Oct. 1, 1986, abandoned. This application Sep. 29, 1987, Ser. No. 104,564
Claims priority, application Italy, Oct. 2, 1985, 22336 A/85
Int. Cl.[4] C08G *18/10, 18/32*
U.S. Cl. 528—60 **11 Claims**

1. A monocomponent polyurethane adhesive having a long "pot life", good "green tack", a high cross-linking rate and good resistance to heat obtained by a process which comprises:
causing a polyurethane resin, having a content of free isocyanate groups of from about 1.5 to 8, and a polyamine selected from the class consisting of aliphatic, cycloaliphatic and heterocyclic polyamines having from 2 to 6 amino groups to react in an organic solvent, at room temperature, by adding the polyurethane resin to the polyamine and wherein the ratio between the number of

isocyanate groups of the polyurethane resin and moles of polyamine is between 0.8 and 1;

adding an epoxy resin to the thus-obtained polyurethane resin containing amino groups, in order to have the number of active hydrogen atoms of polyamine/number of epoxy groups higher than 1; and

heating the mixture at temperature from about 5020 C. to about the boiling point of the solvent, for a time between 30 minutes and 10 hours.

4,873,308

BIOSTABLE, SEGMENTED ALIPHATIC POLYURETHANES AND PROCESS THEREFOR

Arthur J. Coury, St. Paul; Christopher M. Hobot, Mound, and Kurt Carlson, Osseo, all of Minn., assignors to Medtronic, Inc., Minneapolis, Minn.

Filed Sep. 30, 1988, Ser. No. 251,418
Int. Cl.[4] C08G *18/75*
U.S. Cl. 528—75 **17 Claims**

1. A segmented polyurethane comprising:

alternating softer and harder segments linked by urethane groups;

wherein said softer segments comprise a polyurethane having the formula (—O or —OCNH)—(R_1—U—R_2—U)$_m$—R_1—(O— or NHCO—), wherein one of R_1 and R_2 signifies a dimer backbone, U signifies a urethane group and the other of R_1 and R_2 signifies a hydrocarbon moiety free of ether and ester groups and having a molecular weight less than about 1000, and the average value of m is approximately 1 or greater; and

wherein said harder segments comprise a polyurethane having the general formula (—O or —OCNH)—(R_3—U—R_4—U)$_n$—R_3—(O— or NHCO—), wherein R_3 and R_4 both signify hydrocarbon moieties free of ether and ester groups and having molecular weights less than about 500, U signifies a urethane group and the average value of n is approximately 1 or greater.

4,873,309

STABILIZED FLAME-RETARDANT EPOXY RESIN COMPOSITION FROM A BROMINATED EPOXY RESIN AND A VINYL MONOMER DILUENT

Larry S. Corley, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Jun. 8, 1987, Ser. No. 59,434
Int. Cl.[4] C08G *59/14*
U.S. Cl. 528—102 **15 Claims**

1. A composition comprising:

(a) a brominated epoxy resin which is the reaction product of a brominated polyhydric phenol and epichlorohydrin, said brominated epoxy resin having a weight per epoxide within the range of about 450 to about 800 and a bromine content of from about 30 to about 70 percent;

(b) an effective amount of a curing agent for the brominated epoxy resin; and

(c) from about 5 to 50 weight percent, based on the weight of the composition, of at least one reactive diluent selected from the group consisting essentially of aliphatic and aromatic monomers having at least one site of vinyl unsaturation.

4,873,310

AROMATIC POLYAMIDES BASED ON PHENOXYTEREPHTHALIC ACID AND PROCESS FOR PREPARING THEM

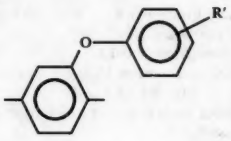
Martin Bartmann, Recklinghausen, Fed. Rep. of Germany, and Naoki Ikeda, Himeji, Japan, assignors to Huls Aktiengesellschaft, Marl, Fed. Rep. of Germany and Daicel Chemical Industries, Ltd., Tokyo, Japan

Filed Mar. 2, 1988, Ser. No. 162,968
Claims priority, application Fed. Rep. of Germany, Mar. 7, 1987, 3707435
Int. Cl.[4] C08G *69/32*
U.S. Cl. 528—208 **3 Claims**

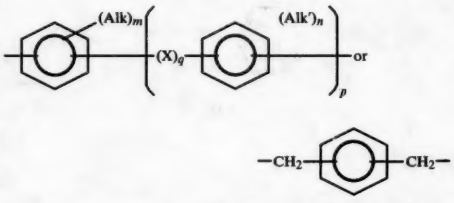
1. A polyamide having structural units of the formula

—(CO—Ar—CO—NH—R—NH)—

in which Ar is a divalent group of the formula



in which R is a straight-chain, branched or cyclic alkylene group with 2 to 20 carbon atoms or a divalent aromatic group of the formula



wherein Alk and Alk' are, independently, alkyl groups with up to 6 carbon atoms, X is a divalent group selected from the group consisting of —O—, —S—, —CH_2—, —$C(CH_3)_2$—, —CO—, and —SO_2—, and p and q are, independently, 0 or 1, and m and n are, independently, 0, 1 or 2, and in which R' is hydrogen, a halogen, an alkyl, aryl, alkoxy, or aryloxy group, each with up to 12 carbon atoms.

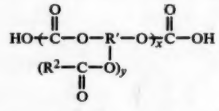
4,873,311

WATER DISPERSIBLE POLYAMIDE ESTER

Walter K. Bornack, Jr., Amherst, N.Y., and Keith R. McNally, Bedminster, N.J., assignors to Union Camp Corporation, Wayne, N.J.

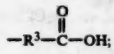
Filed Feb. 5, 1988, Ser. No. 152,640
Int. Cl.[4] C08G *63/02*
U.S. Cl. 528—272 **16 Claims**

1. A composition having the formula:



wherein x is an integer of 1-5; R'=a polyamide ester chain of molecular weight 500-2000; where y is an integer of 1-3; R^2 is independently at each occurrence the residue of a cyclic car-

boxylic anhydride bearing at least one free carboxyl group or



where R^3 is independently at each occurrence R' or a polyamide segment of up to 2000 MW.

4,873,312

METHOD FOR PURIFYING INTERFERON AND COMPOSITION OF MATTER PRODUCED THEREBY

Tsutomu Arakawa, Thousand Oaks, Calif., assignor to Amgen, Thousand Oaks, Calif.

Filed Apr. 25, 1985, Ser. No. 727,147

Int. Cl.[4] C07K *15/26;* **A61K** *45/02*

U.S. Cl. 530—351 **2 Claims**

1. A method for obtaining monomeric gamma interferon substantially free of associated states comprising the steps of:

providing purified gamma interferon in an aggregated form which lacks intermolecular covalent bonds and which is excluded from a gel filtration column whose characteristics are such that proteins of molecular weight greater than about 80,000 daltons are excluded;

unfolding the gamma interferon in a solution containing a denaturant;

diluting the solution to achieve a concentration of less than 0.18 mg of gamma interferon per ml; and

concentrating the diluted solution by diafiltration.

4,873,313

SPECIFIC HYBRIDOMA CELL LINE AND MONOCOLONAL ANTIBODIES PRODUCED FROM SUCH SPECIFIC HYBRIDOMA CELL LINE AND METHOD OF USING SUCH MONOCLONAL ANTIBODIES TO DETECT CARCINOEMBRYONIC ANTIGENS

Frances G. Crawford, Houston, Tex.; John E. Shively, Arcadia, Calif.; Charles W. Todd, Arcadia, Calif., and Y. H. Joy Yang, Arcadia, Calif., assignors to Beckman Research Institute of City of Hope, Duarte, Calif.

Continuation-in-part of Ser. No. 692,515, Jan. 18, 1985, abandoned. This application Apr. 18, 1985, Ser. No. 725,492

Int. Cl.[4] A61K *39/395;* **C07K** *15/14;* **C12N** *15/00;* **G01N** *33/574*

U.S. Cl. 530—387 **6 Claims**

1. A hybriboma cell line designated as T84.66-A3.1-H-11 cell line ATCC Accession No. HB8747.

4,873,314

PROCESS FOR THE PRODUCTION OF POLYCARBONATE SOLUTIONS

Klaus Berg; Karsten-Josef Idel, both of Krefeld, and Ulrich Grigo, Kempen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Feb. 18, 1988, Ser. No. 157,438

Claims priority, application Fed. Rep. of Germany, Feb. 26, 1987, 3706205

Int. Cl.[4] C08G *63/74, 63/62*

U.S. Cl. 528—487 **2 Claims**

1. In the process for preparing a thermoplastic aromatic polycarbonate resin by the condensation of diphenols in the two phase interfacial process the improvement comprising adding to the aqueous emulsion of the polycarbonate thus produced 2.5 to 100 ppm of phosphorus acid said adding being before said emulsion is separated, said acid remaining in the aqueous phase of said process and said ppm being relative to the weight of diphenols thus condensed.

4,873,315

PERFLUORINATED PROPYL DERIVATIVE COMPOUNDS

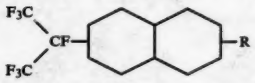
Frank K. Schweighardt, Allentown; Webb I. Bailey, Fogelsville; John T. Lileck, Tamaqua; John K. Graybill, Macungie, and Eugene G. Lutz, Drums, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Aug. 25, 1987, Ser. No. 89,293

Int. Cl.[4] C07C *19/08, 17/02*

U.S. Cl. 570—130 **2 Claims**

1. The perfluorinated compounds having the formula:



wherein the carbon rings are fully fluorinated.

4,873,316

ISOLATION OF EXOGENOUS RECOMBINANT PROTEINS FROM THE MILK OF TRANSGENIC MAMMALS

Harry Meade, Newton, Mass., and Nils Lonberg, New York, N.Y., assignors to Biogen, Inc., Cambridge, Mass.

Filed Jun. 23, 1987, Ser. No. 65,994

Int. Cl.[4] C07K *3/02, 3/12, 3/18;* **C12N** *15/00*

U.S. Cl. 530—412 **3 Claims**

1. A process for the production and secretion into mammal's milk of an exogenous recombinate protein comprising the steps of:

a. producing milk in a transgenic mammal characterized by an expression system comprising a casein promoter operatively linked to an exogenous DNA sequence coding for the recombinant protein through a DNA sequence coding for a signal peptide effective in secreting and maturing the recombinant protein in mammary tissue;

b. collecting the milk; and

c. isolating the exogenous recombinant protein from the milk.

4,873,317

METHOD OF SEPARATING OR PURIFYING PROTEINS AND OTHER BIOPOLYMERS

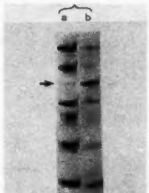
Melvyn Rosenberg, 12 Yeda Am Street, and Ilana Eli, 22 Shazar Street, both of Ramat-Gan, Israel

Filed Mar. 5, 1987, Ser. No. 22,225

Claims priority, application Israel, Mar. 13, 1986, 78130

Int. Cl.[4] C07K *3/12, 3/20, 3/24;* **C12P** *21/00*

U.S. Cl. 530—412 **16 Claims**



1. The method for the separation or purification of biopolymers comprising the steps:

adsorbing the biopolymer on the surface of liquid oil droplets;

and separating the adsorbed biopolymer from the oil droplets.

4,873,318

OXAZINE-UREAS AND THIAZINE UREA CHROMOPHORS

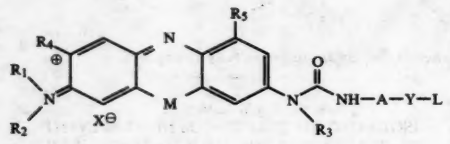
Spyros Theodoropulos, 2964 Hickory St., Yorktown Heights, N.Y. 10598

Continuation-in-part of Ser. No. 69,860, Jul. 6, 1987, abandoned, which is a continuation-in-part of Ser. No. 753,937, Jul. 11, 1985, Pat. No. 4,714,763. This application Oct. 20, 1987, Ser. No. 110,415

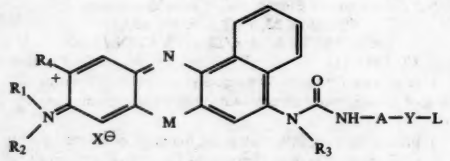
Int. Cl.[4] C07D *265/38, 279/36*

U.S. Cl. 530—387 8 Claims

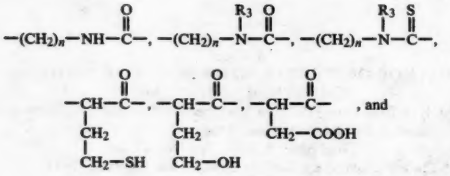
1. An adduct of urea derivatives of oxazine and thiazine chromophors and an antibody, said adduct being selected from the group consisting of:

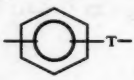


and



wherein R^1–R^3 are hydrogen or alkyl of 1 to 10 carbon atoms; R^4 and R^5 are R^1, halogen or amino; M is oxygen or sulfur; X^- is an organic or inorganic anion; A is selected from the group consisting of:





wherein T represents

NR^3 and

M represents oxygen or sulfur; Y is sulfur or a primary or secondary amine of from 1 to 12 carbon atoms; and L is an antibody.

4,873,319

DISAZO DYES CONTAINING A PYRIMIDINE COUPLING COMPONENT AND A CATIONIC ALKYL AMMONIUM GROUP

Willy Stingelin, Reinach, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

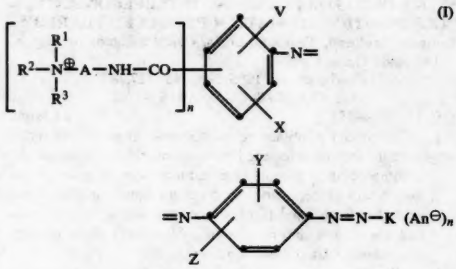
Filed Sep. 25, 1987, Ser. No. 100,853

Claims priority, application Switzerland, Oct. 3, 1986, 3960/86

Int. Cl.[4] C09B *44/02, 44/08;* D06P *1/41, 3/58*

U.S. Cl. 534—604 15 Claims

1. An unsulfonated cationic disazo dye of formula



(I)

wherein

R^1, R^2 and R^3 are each independently an unsubstituted alkyl radical or an alkyl radical which is substituted by hydroxy, phenyl or alkoxy, or R^1 and R^2, together with the linking nitrogen atom are a pyrrolidine, piperidine, morpholine or piperazine radical, or R^1, R^2 and R^3, together with the linking nitrogen atom, are a pyridinium or triethylenediamine radical,

A is a C_2–C_6alkylene radical,

V and X are each independently of the other hydrogen or C_1–C_4alkyl or C_1–C_4alkoxy, each unsubstituted or substituted by hydroxy, halogen, cyano or C_1–C_4alkoxy,

Y is hydrogen, C_1–C_4alkyl or C_1–C_4alkoxy, halogen, or cyano,

Z is hydrogen, C_1–C_4alkyl or C_1–C_4alkoxy, halogen, cyano, or a group of formula

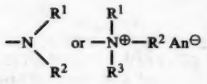
—NH—CHO,

—NH—CO—NH_2,

—NH—CO—NH—Q or

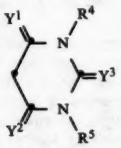
—NH—CO—$(O)_m$—Q,

wherein m is 0 or 1 and Q is C_1–C_4alkyl which is unsubstituted or substituted by halogen or groups of the formulae



or Q is phenyl which is unsubstituted or substituted by C_1–C_4alkyl, C_1–C_4alkoxy, halogen or nitro,

K is a coupling component of formula



(II)

wherein

Y^1 and Y^2 are each independently of the other =O, =NH, or =N—C_1–C_4alkyl,

Y^3 is =O, =S, =NR or =N—CN, where R is hydrogen or C_1–C_4alkyl,

R^4 and R^5 are each independently of the other hydrogen, alkyl which is unsubstituted or substituted by hydroxy, C_1–C_4alkoxy or C_1–C_4hydroxyalkoxy or they are phenyl which is unsubstituted or substituted by C_1–C_4alkyl, C_1–C_4alkoxy, halogen or nitro,

n is 1 or 2, and

$An^{\ominus}$ is an anion.

4,873,320

WATER-SOLUBLE MONOAZO AND DISAZO DYES CONTAINING A FIBER-REACTIVE 2-CHLORO-4-(NITROPHENYLAMINO-ALKYLAMINO)-S-TRIAZIN-6-YLAMINO GROUPING WITH A FIBER-REACTIVE GROUP OF THE VINYLSULFONE SERIES AS A SUBSTITUENT IN THE NITROPHENYL MOIETY

Hartmut Springer, Königstein/Taunus; Manfred Kühn, Frankfurt am Main, and Holger M. Büch, Hofheim am Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

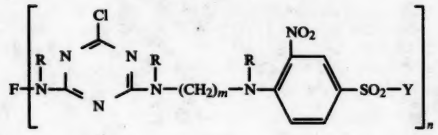
Filed Dec. 15, 1987, Ser. No. 133,009

Claims priority, application Fed. Rep. of Germany, Dec. 17, 1986, 3643014

Int. Cl.[4] C09B *62/085, 62/03, 62/53, 62/533*

U.S. Cl. 534—632 **16 Claims**

1. A compound which corresponds to the formula



in which:

F denotes the radical of a sulfo group-containing monoazo or disazo dye;

m denotes the number 2 or 3;

n denotes the number 1 or 2;

R denotes a hydrogen atom or an alkyl group having 1 to 4 carbon atoms; and

Y denotes the vinyl group or a group of the formula

$$—CH_2—CH_2—X$$

in which X represents a substituent which can be eliminated as an anion, by means of an alkali.

4,873,321

MONAZO COMPOUNDS HAVING A TRIOZINYL BRIDGING GROUP AND TWO VINYLSULFONE TYPE FIBER REACTIVE GROUPS

Takashi Omura, Ashiya; Sadanobu Kikkawa; Toshihiko Morimitsu, both of Minoo; Naoki Harada, Suita, and Tetsuya Miyamoto, Takatsuki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

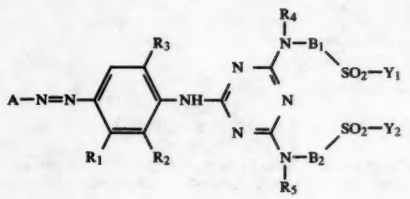
Filed Sep. 29, 1987, Ser. No. 102,497

Claims priority, application Japan, Oct. 17, 1986, 61-248200; Feb. 20, 1987, 62-38301

Int. Cl.[4] C09B *62/503, 62/51;* **D06P** *1/38, 3/66*

U.S. Cl. 534—642 **11 Claims**

1. A compound of the following formula,



wherein A is phenyl substituted with a water-solubilizing group or naphthyl substituted with a water-solubilizing group, B_1 and B_2 independently of one another are each phenylene unsubstituted or substituted with methyl, ethyl, methoxy, ethoxy, halogeno, sulfo or carboxy, or naphthlene unsubstituted or substituted with sulfo, R_1 is hydrogen, halogeno, C_{1-4} alkyl, C_{1-4} alkoxy, ureido or acylamino, said acylamino being selected from —NHCOC_{1-4} alkyl, —NHCOC_{2-4} alkenyl and benzoylamino, in which the alkyl and alkenyl are unsubstituted or substituted with sulfo, carboxy or halogeno, and the benzoyl is unsubstituted or substituted with sulfo, carboxy, methyl or halogeno, R_2 is hydrogen or taken together with R_1 forms a benzene ring unsubstituted or substituted with sulfo, R_3 is hydrogen, C_{1-4} alkyl, C_{1-4} alkoxy or sulfo, R_4 and R_5 independently of one another are each hydrogen or alkyl unsubstituted or substituted with hydroxy, cyano, C_{1-4} alkoxy, halogeno, carboxy, carbamoyl, C_{1-4} alkoxycarbonyl, C_{1-4} alkylcarbonyloxy, sulfo or sulfamoyl, and Y_1 and Y_2 independently of one another are each vinyl or —CH_2CH_2L in which L is a group capable of being split by the action of an alkali.

4,873,322

SACCHARIDE DERIVATIVES AND PROCESSES FOR THEIR MANUFACTURE

Bruno Fechtig, Reinach, and Gerhard Baschang, Bettingen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

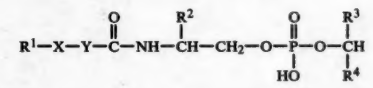
Filed Jan. 16, 1987, Ser. No. 3,986

Claims priority, application Switzerland, Jan. 24, 1986, 276/86

Int. Cl.[4] A61K *37/00*

U.S. Cl. 536—4.1 **27 Claims**

1. A saccharide derivative of the formula I



(I)

in which R^1 represents a) aldohexosyl, (b) D-aldohexosyl that is glycosidically linked in the 4- or the 6-position to D-aldohexosyl, (c) aldopentosyl, (d) 6-deoxy-aldohexosyl or (e) 2-acetylamino-2-deoxy-D-aldohexosyl, it being possible for free hydroxy groups present in the radicals mentioned under a) to e) above to be peracetylated, X represents oxygen or sulphur, Y represents alkylene having up to 10 carbon atoms in which from 1 to 3 non-terminal methylene groups may be replaced by oxygen, by carbonylimino or by carbonyloxy, R^2 represents hydrogen, carboxy, lower alkoxycarbonyl, benzyloxycarbonyl or carbamoyl, R^3 represents hydrogen and R^4 represents a 1,2-dihydroxyethyl, 2-hydroxy-ethyl or hydroxymethyl group in which at least one hydroxy group is esterified by an unsubstituted aliphatic C_{10-24}-carboxylic acid and in which the other hydroxy group, if present, is free or esterified by an aliphatic C_{2-24}-carboxylic acid, or R^3 and R^4 each represents a hydroxymethyl group esterified by an unsubstituted aliphatic C_{10-24}-carboxylic acid, or a pharmaceutically acceptable salt thereof, or a mixture of said saccharide derivative and its pharmaceutically acceptable salt.

25. A pharmaceutical preparation for the prophylaxis or therapy of a virus infection in or on a warm-blooded animal containing an in vivo antivirally effective amount of a pharmaceutically acceptable salt according to claim 1 together with a pharmaceutical carrier.

4,873,323

ACID/HEAT MODIFIED POLYSACCHARIDE BIOPOLYMERS

Patrick Cros, and Robert Pipon, both of Melle, France, assignors to Rhone-Poulenc Specialites Chimiques, Courbevoie, France

Filed Aug. 14, 1986, Ser. No. 896,282
Claims priority, application France, Aug. 14, 1985, 85 12382
Int. Cl.[4] C07G *17/001;* C08B *37/00;* E21B *43/22*
U.S. Cl. 536—114 9 Claims

1. A process for the preparation of a modified polysaccharide biopolymer, comprising (i) acidifying an aqueous composition of a polysaccharide with nitric acid to a pH of from about 2 to 0.1, (ii) heat-treating said acidified composition at a temperature of from about 50° to 100° C. for from about 5 to 60 minutes, and (iii) cooling said heat-treated composition and adjusting the pH thereof to a value of from about 5 to 7, said acidifying and heat treating giving rise to a modified polysaccharide having a decreased number of acetyl groups compared to an unmodified polysaccharide.

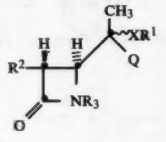
4,873,324

PROCESS FOR CHIRAL SYNTHESIS OF 1-BETA-METHYL-CARBAPENEM INTERMEDIATES

Burton G. Christensen, Cliffside Park; Lovji D. Cama, Cresskill, and Susan M. Schmitt, Scotch Plains, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 157,165, Feb. 11, 1988, abandoned, which is a continuation of Ser. No. 59,143, Jun. 5, 1987, abandoned, which is a continuation of Ser. No. 8,050, Jan. 15, 1987, abandoned, which is a continuation of Ser. No. 703,052, Feb. 19, 1985, abandoned. This application Feb. 6, 1989, Ser. No. 307,135
Int. Cl.[4] C07D *205/08;* C07F *7/18, 487/04, 35/06*
U.S. Cl. 540—200 6 Claims

1. A compound of the structural formula:



wherein R^2 is independently selected from hydrogen, linear or branched C_1–C_3 alkyl, which can be substituted with fluoro, hydroxy, or protected hydroxy, R^3 is hydrogen or a protecting group, X is sulfur or selenium, Q is hydroxymethyl, carboxy or C_1–C_4 alkoxycarbonyl, and R^1 is C_1–C_4 alkyl, C_6–C_{10} aryl, and pyridyl which can be substituted with C_1–C_4 alkyl, alkoxy and nitro.

4,873,325

PROCESS FOR THE PRODUCTION OF AMIDES

Kurt D. Olson, Cross Lanes, W. Va., assignor to UOP, Des Plaines, Ill.

Filed Jun. 25, 1986, Ser. No. 878,215
Int. Cl.[4] C07D *201/04*
U.S. Cl. 540—536 74 Claims

1. A process for converting an oxime into a corresponding amide, which process comprises contacting the oxime with a non-zeolitic molecular sieve, the nonzeolitic molecular sieve having, in its calcined form, an adsorption of isobutane of at least about 2 percent by weight of the non-zeolitic molecular sieve at a partial pressure of 500 torr and a temperature of 20° C., the contacting of the oxime with the non-zeolitic molecular sieve being effected under conditions effective to convert the oxime into the corresponding amide.

4,873,326

PROCESS FOR THE PREPARATION OF N-ALKYLATED CAPROLACTAMS

Wolfgang Jakob, Moers; Wolfgang Alewelt, and Erhard Tresper, both of Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen Bayerwerk, Fed. Rep. of Germany

Filed Aug. 11, 1988, Ser. No. 231,232
Claims priority, application Fed. Rep. of Germany, Aug. 15, 1987, 3727255; Oct. 23, 1987, 3735904
Int. Cl.[4] C07D *223/10*
U.S. Cl. 540—538 3 Claims

1. Process for the preparation of N-alkylcaprolactams by the cyclisation of N-alkylaminocaproic acids or their salts, characterised in that solutions of N-alkylaminocaproic acids or their salts in the corresponding N-alkylaminocaprolactams are adjusted to the isoelectric point of the N-alkylaminocaproic acid, the solutions are briefly heated to the boiling point of the N-alkylaminocaprolactam and after removal of the water of reaction by distillation the N-alkylaminocaprolactam is optionally directly returned to a reaction solution or the lactam is separated by distillation and purified.

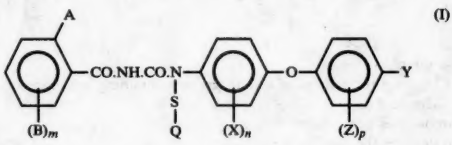
4,873,327

PESTICIDAL BENZOYLUREA COMPOUNDS

Martin Anderson, Whitstable, and Anthony G. Brinnand, Faversham, both of England, assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 906,361, Sep. 10, 1986, Pat. No. 4,745,113. This application Mar. 8, 1988, Ser. No. 165,528
Int. Cl.[4] C07D *295/12, 211/56;* C07C *149/40, 145/04*
U.S. Cl. 544—59 1 Claim

1. A compound of the general formula

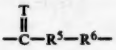


(I)

in which each of A and B independently represents a halogen atom or an alkyl group; m is 0 or 1; Q represents a group of general formula

in which R represents an optionally substituted alkylene group in which a —CH_2— group is replaced by an oxygen or sulphur atom or by a sulphone or sulphoxide group, or by a group N—R^1 in which R^1 represents an optionally substituted alkyl, alkylcarbonyl, alkoxycarbonyl, dialkylaminocarbonyl, alkylsulphonyl or arylsulphonyl group, or in whch a —CH_2— group is replaced by a carbonyl or thiocarbonyl group, or Q represents a group of general formula —$CR^2R^3R^4$ in which R^2 represents a hydrogen atom or an optionally substituted alkyl group, R^3 represents a halogen atom or a cyano or nitro group, or an optionally substituted alkylcarbonyl, alkoxycarbonyl, arylcarbonyl aryloxycarbonyl or dialkylaminocarbonyl group, and R^4 represents any one of the moieties specified for R^2

and/or R^3, or R^2 and R^4 together represent an optionally substituted alkylene group, or R^3 and R^4 together represent a group of general formula



in which T represents a sulphur or oxygen atom, R^5 represents an optionally substituted alkylene group and R^6 represents a methylene, carbonyl or thiocarbonyl group; the optical substituents for an alkyl moiety or alkylene group being selected from halogen atoms and cyano, alkoxy, haloalkoxy, alkylcarbonyl, haloalkylcarbonyl, alkoxycarbonyl and haloalkoxycarbonyl groups and the optional substituents for an aryl group being selected from these substituents and also from alkyl, haloalkyl and nitro groups; X represents a halogen atom or a cyano, nitro, alkyl or haloalkyl group; each of Y and Z independently represents a halogen atom or a cyano, nitro or haloalkyl group; n is 0, 1, 2, 3 or 4; and p is 0, 1 or 2.

4,873,328

PROCESS FOR PREPARING ALKOXYALKYLIDENEHYDRAZINOPYRIDAZINE DERIVATIVES

Carlo Farina, Como; Mario Pinza, Milan; Alberto Cerri, Pavia, and Francesco Parravicini, Milan, all of Italy, assignors to I.S.F. Societa Per Azioni, Milan, Italy

Filed Jan. 5, 1988, Ser. No. 140,850

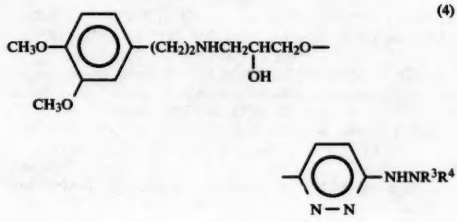
Claims priority, application Italy, Jan. 8, 1987, 19026 A/87

Int. Cl.[4] C07D *237/21;* A61K *31/50*

U.S. Cl. 544—239 **5 Claims**

1. A process for preparing a compound of the formula (4), or a pharmaceutically acceptable salt thereof:

(4)



wherein

R^3 and R^4 are both hydrogen or together are $=CR^1R^2$

where

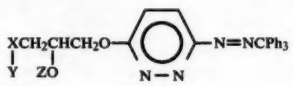
R^1 is hydrogen or C_{1-3} alkyl and

R^2 is C_{1-3}alkyl, carboxy or phenyl,

which process comprises:

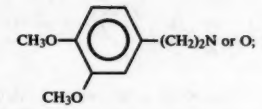
(a) adding hydrogen to the double bond of a compound of the formula (5):

(5)



wherein

X is



Y and Z are both hydrogen or

Y and Z together are a protecting group

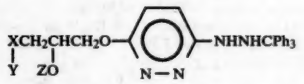
wherein

R^5 is hydrogen or C_{1-3}alkyl and R^6 is C_{1-3}alkyl or phenyl, and

Ph is phenyl,

to afford a compound of the formula (6):

(6)

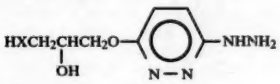


wherein Ph, X, Y and z are as hereinbefore defined, and

(b) removing by acid catalyzed hydrolysis the triphenylmethyl group, the

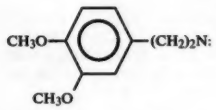
group and any other protecting groups added in the reaction in step (a) to afford a compound of the formula (7) or an acid-addition salt thereof:

(7)



wherein X is as hereinbefore defined.

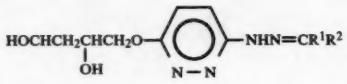
(c) when X is



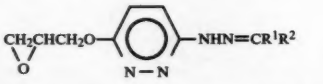
reacting a compound of formula (7) with R^1R^2CO wherein R^1 and R^2 are as hereinbefore defined to yield a compound of the formula (4):

or when X is 0:

reacting a compound of formula (7) with R^1R^2CO wherein R^1 and R^2 are as hereinbefore defined to afford a compound of the formula (8):



wherein R^1 and R^2 are as hereinbefore defined which is converted by treatment with hydrogen bromide in acid, followed by treatment with a base to a compound of the formula (9):



wherein R^1 and R^2 are as hereinbefore defined which is reacted with 3,4-dimethoxyphenethylamine, and thereafter removing the CR^1R^2 group by hydrolysis, to yield a compound of formula (4).

4,873,329

ALKENE, ALKYNE OR CYCLOALKYLENE DERIVATIVES

Leslie R. Hughes, Macclesfield; John Oldfield, Wilmslow, and Howard Tucker, Macclesfield, all of England, assignors to Imperial Chemical Industries PLC, London, England

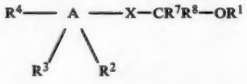
Filed Feb. 21, 1985, Ser. No. 704,038

Claims priority, application United Kingdom, Mar. 7, 1984, 8406000

Int. Cl.[4] C07D *473/00, 215/16*

U.S. Cl. 544—265 **4 Claims**

1. A compound of the formula



wherein X is trans- —CH=CH—, wherein ring A is 3,4-dichlorophenyl, 3-chloro-4-cyanophenyl, 3-chloro-4-fluorophenyl, 4-chloro-3-trifluoromethylphenyl, 4-cyanophenyl, 4-cyano-3-fluorophenyl, 4-cyano-3-trifluoromethylphenyl or 4-fluoro-3-trifluoromethylphenyl, wherein R^1 is hydrogen, wherein R^7 is trifluoromethyl and wherein R^8 is ethyl, ethynyl, cyanomethyl, 1-cyanoethyl, acetyl, methylsulphonylmethyl, p-methylsulphonylphenylsulphonylmethyl or pyrid-2-ylsulphonylmethyl or has the formula $—CH_2SR^9$ wherein R^9 is m-methylthiophenyl, pyrid-4-yl, pyrimid-2-yl, 4,6-dimethylpyrimid-2-yl, purin-6-yl, 1H-pyrazolo [3,4,-d]pyrimidin-4-yl, imidazol-2-yl, 1-methylimidazol-2-yl, 7-chloroquinolin-4-yl or 7-trifluoromethylquinolin-4-yl.

4,873,330

A PROCESS FOR THE PREPARATION OF ANHYDROUS, STABLE, CRYSTALLINE DELTA-FORM OF PRAZOSIN HYDROCHLORIDE

Stig O. E. Lindholm, Helsinki, Finland, assignor to Orion-yhtymä Oy, Helsinki, Finland

Division of Ser. No. 660,871, Oct. 15, 1984, Pat. No. 4,739,055. This application Feb. 8, 1988, Ser. No. 153,780

Claims priority, application Finland, Jun. 25, 1984, 842544

Int. Cl.[4] C07D *405/14*

U.S. Cl. 544—291 **9 Claims**

1. The process for producing anhydrous stable, crystalline δ-form of prazosin hydrochloride, wherein the water of crystalline of the prazosin hydrochloride hydrate is removed by azeotropic distillation with organic solvents having a boiling point in the range of 55°-160° C. selected from the group consisting of hexane, heptane and corresponding alkanes with linear and branched chains and cycloalkanes; benzene, xylene and corresponding aromatic hydrocarbons, and chloroform, trichloroethylene, 1,2-dichloroethane, 1,1,1-trichloroethane and corresponding halogenated hydrocarbons.

4,873,331

NORADAMANTYL-CARBOXYLIC ACID PIPERAZINOALKYL ESTERS

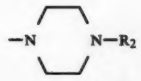
Wayne E. Childers, Jr., Yardley, and Magid A. Abou-Gharbia, Glen Mills, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Dec. 9, 1988, Ser. No. 282,711

Int. Cl.[4] C07D *401/04, 403/04, 295/06, 295/08*

U.S. Cl. 544—295 **6 Claims**

1. A compound of formula:



wherein

R^1 is 3-noradamantyl;

n is 0 or 1;

X is $—CO_2—$, $—O_2C—$ or $—OCO_2—$;

m is 1, 2, 3, 4 or 5;

and R^2 is phenyl, benzyl, pyridinyl, pyrimidinyl, pyrazinyl, a substitued phenyl or benzyl in which the substituent is alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, halo, cyano, nitro or trifluoromethyl; or a pharmaceutically acceptable salt thereof.

4,873,332

METAL-CONTAINING INDOANILINE COMPOUND AND OPTICAL RECORDING MEDIUM EMPLOYING THE COMPOUND

Katsuhira Yoshida, and Yuji Kubo, both of Kochi, Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

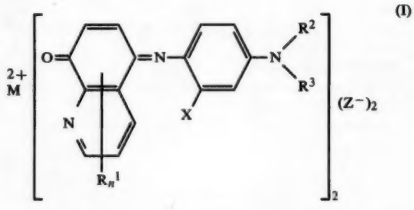
Filed Sep. 23, 1987, Ser. No. 100,264

Claims priority, application Japan, Mar. 14, 1987, 62-59777

Int. Cl.[4] C07D *215/30;* **C07F** *15/04, 15/06, 1/08*

U.S. Cl. 546—7 **8 Claims**

1. A metal-containing indoaniline compound having the formula:



(I)

wherein M is a metal atom selected from the group consisting of Ni, Cu or Co, R^1 is a hydrogen atom, a halogen atom or a methyl group, n is 1 or 2, X is a hydrogen atom or a lower alkyl group, each of R^2 and R^3 is a lower alkyl group, and Z^- is an anion.

4,873,333

NITROGEN-CONTAINING BIDENTATE COMPOUND IMMOBILIZED ON A SOLID INORGANIC CARRIER

Johan Stapersma, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

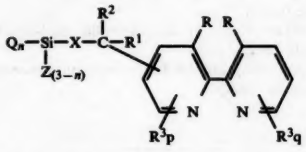
Division of Ser. No. 165,054, Mar. 7, 1988. This application Mar. 27, 1989, Ser. No. 328,648

Claims priority, application United Kingdom, Mar. 25, 1987, 8707131

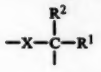
Int. Cl.[4] C07D *471/04*; C07F *7/18*; B01J *31/02*

U.S. Cl. 546—14 **5 Claims**

1. A compound of the formula:



wherein Si is silicon, Q is an alkoxy or aryloxy group of up to 10 carbon atoms; Z is an alkyl, aryl, alkoxy or aryloxy group of up to 10 carbon atoms; n is an integer 1, 2 or 3; R^1 and R^2 independently are hydrogen, ah alkyl or cycloaklyl of up to 7 carbon atoms or a benzyl group; or both R^1 and R^2 together form a group $-(CH_2)_a-$ wherein a is an integer of from 2 to 6; each R is hydrogen or both R's together form the group —CH=CH—; each R^3 individually is an alkyl of 1 to 6 carbon atoms, phenyl, alkoxy of 1 to 6 carbon atoms, phenoxy, alkylthio of 1 to 6 carbon atoms or phenylthio group and p and q are integers of from 0 to 2 and from 0 to 3, respectively; the



group is linked to a carbon atom of the heterocyclic aromatic ring which occupies the ortho- or para-position with respect to the nitrogen atom in said heterocyclic ring; and X is a bivalent organic radical.

4,873,334

4,7-DIHYDROPYRAZOLO(3,4-b) PYRIDINE DERIVATIVES

Ikuo Adachi, Osaka; Teruo Yamamori, Hyogo; Motohiko Ueda, Osaka, and Hatsuo Sato, Nara, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

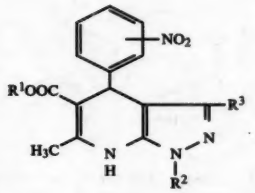
Continuation-in-part of Ser. No. 709,795, Mar. 8, 1985, abandoned, which is a continuation-in-part of Ser. No. 18,815, Feb. 19, 1987, abandoned, which is a continuation of Ser. No. 527,733, Aug. 30, 1983, abandoned. This application Sep. 22, 1987, Ser. No. 99,907

Claims priority, application Japan, Oct. 5, 1982, 57-176763; Mar. 19, 1984, 69-53118

Int. Cl.[4] A61K *31/44*; C07D *471/04*

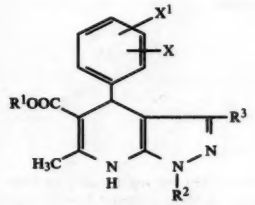
U.S. Cl. 514—303 **18 Claims**

1. A 4,7-dihydropyrazolo[3,4-b]-pyridine derivative represented by the formula:



wherein R^1 is (a) straight or branched chain C_5–C_8 alkyl, (b) C_4–C_6 cycloalkyl which may be substituted by lower alkyl, (c) C_3–C_7 cycloalkyl (C_1–C_4)alkyl, (d) C_1–C_4 alkoxy-(C_1–C_4)alkyl, (e) C_4–C_7 cycloalkyloxy(C_1–C_4)alkyl, (f) phenoxy(C_1–C_4)alkyl, (g) C_1–C_4 alkylthio(C_1–C_4)alkyl, (h) C_4–C_7 cycloalkylthio(C_1–C_4)alkyl, (i) phenylthio(C_1–C_4)alkyl, (j) C_1–C_4 monalkylamino or C_2–C_8 dialkylamino-substituted (C_1–C_4)alkyl, (k) tetrahydrofuryl(C_1–C_4)alkyl, (l) phenyl(C_1–C_3)alkyl, which may have one or more substituents of halogen or C_1–C_4 alkoxy, (m) N-benzylpyrrolidinyl, or (n) N-benzylpiperidinyl; R^2 is C_1–C_4 alkyl; and R^3 is C_4–C_6 cycloalkyl or C_3–C_7 cycloalkyl(C_1–C_4)alkyl; and the pharmaceutically acceptable acid addition salts thereof.

8. A 4,7-dihydropyrazolo[3,4-b]pyridine derivative represented by the formula:



wherein X and X^1 each is hydrogen, nitro, or halogen which may be located at the position or positions 2, 3, and/or 6;

R^1 is C_1–C_4 alkyl; R^2 is hydrogen, C_1–C_4 alkyl, C_4–C_6 cycloalkyl, or phenyl;

R^3 is hydrogen, C_1–C_8 straight or branched chain alkyl, C_3–C_7 cycloalkyl which may be substituted by C_1–C_3 alkyl, phenyl which may be substituted by chlorine, trifluoromethyl, cyano, methoxy, methoxycarbonyl or ethoxycarbonyl, C_7–C_9 aralkyl or C_1–C_4 alkoxycarbonyl; or pharmaceutically acceptable acid addition salts thereof.

4,873,335

3-PHENETHYL-2-BENZENE-AMIDES OR AZA-DERIVATIVES THEREOF

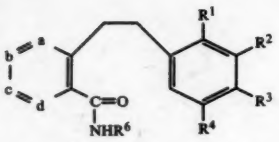
Doris P. Schumacher, Florham Park; Bruce L. Murphy, Elizabeth, and Jon E. Clark, Highland Park, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Division of Ser. No. 839,016, Mar. 12, 1986, Pat. No. 4,731,447, which is a continuation-in-part of Ser. No. 733,428, May 13, 1985, abandoned. This application Dec. 2, 1987, Ser. No. 127,743

Int. Cl.[4] C07D *213/56*; C07C *103/22, 103/26*

U.S. Cl. 546—194 **7 Claims**

1. A compound of the formula IV



IV

wherein:

a, b, c and d represent CH or one of a, b, c and d represents N and the others represent CH;

R^1, R^2, R^3 and R^4 may be the same or different and each independently represents hydrogen, alkyl having from 1 to 6 carbon atoms, halogen, nitro, alkoxy having from 1 to 6 carbon atoms or trifluoromethyl; and

R^6 represents a tertiary butyl group.

4,873,336

PROCESS FOR THE PREPARATION OF N-VINYL LACTAMS

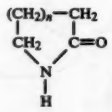
Kou-Chang Liu, Wayne, and Paul D. Taylor, West Milford, both of N.J., assignors to GAF Corporation, Wayne, N.J.

Filed Mar. 28, 1988, Ser. No. 183,559

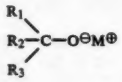
Int. Cl.[4] C07D *207/267, 211/74, 223/00*

U.S. Cl. 546—243 **16 Claims**

1. A single stage non-aqueous liquid process for the preparation of an N-vinyl lactam which comprises reacting a lactam having the formula



wherein n is an integer having a value of from 1 to 3 with acetylene under an acetylene partial pressure of from about 25 to about 125 psig. in the presence of a catalyst having the formula



wherein R_1, R_2 and R_3 are each lower alkyl or aryl or wherein one of R_1, R_2 and R_3 is hydrogen and M is an alkali metal.

4,873,337

N-SUBSTITUTED DERIVATIVES OF 2-(PYRIDYLALKENESULFINYL) BENZIMIDAZOLES AS GASTRIC ANTISECRETORY AGENTS

John C. Sih, and Moo J. Cho, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 761,239, Jul. 31, 1985, abandoned, which is a continuation-in-part of Ser. No. 653,999, Sep. 24, 1984, abandoned, and a continuation-in-part of Ser. No. 682,980, Dec. 18, 1984, abandoned. This application Aug. 3, 1987, Ser. No. 81,583

Int. Cl.[4] C07D *401/12*

U.S. Cl. 546—271 **3 Claims**

1. A compound selected from the group consisting of:

2-[(2-pyridinylmethyl)sulfinyl]-1H-benzimidazole-1-methanol,

2[(4-methoxy-3,5-dimethyl-2-pyridinylmethyl)-thio]-1H-benzimidazole-1-methanol,

2-[(4-ethylthio-3-methyl-2-pyridinylmethyl)thio]-1H-benzimidazole-1-methanol,

2-[(4-chloro-3-methyl-2-pyridinylmethyl)thio]-1H-benzimidazole-1-methanol,

2-[(4-methoxy-3,5-dimethyl)-2-pyridinylmethyl)thio-1H-benzimidazole-1-methanol, acetate (ester),

2-[(2-pyridinylmethyl)thio]-1H-benzimidazole-1-methanol, acetate (ester),

2-[(4-ethylthio-3-methyl-2-pyridinylmethyl)thio]-1H-benzimidazole-1-methanol, acetate (ester),

2-[(4-chloro-3-methyl-2-pyridinylmethyl)thio]-1H-benzimidazole-1-methanol, acetate (ester),

2-[(2-pyridinylmethyl)thio]-1H-benzimidazole-1-methanol, methyl succinate (ester),

2-[(2-pyridinylmethyl)thio]-1H-benzimidazole-1-methanol, octanoate (ester),

2-[(2-pyridinylmethyl)thio]-1H-benzimidazole-1-methanol, isobutyrate (ester), and

2-[(2-pyridinylmethyl)thio]-1H-benzimidazole-1-methanol, isopropionate (ester).

4,873,338

PROCESS FOR THE PREPARATION OF 2-AMINO-5-ACYLAMINO PHENOLS AND STARTING COMPOUNDS SUITABLE THEREFOR

Heinz Wiesen, Euskirchen, and Erich Wolff, Solingen, both of Fed. Rep. of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

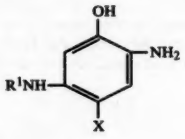
Filed Nov. 23, 1987, Ser. No. 123,920

Claims priority, application Fed. Rep. of Germany, Dec. 6, 1986, 3641825

Int. Cl.[4] C07D *213/64*; C07C *102/00, 143/675, 103/30*

U.S. Cl. 546—253 **3 Claims**

1. Process for the preparation of compounds corresponding to Formula I

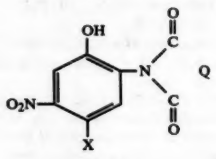


wherein

R^1 denotes an acyl group derived from an aliphatic or aromatic carboxylic or sulfonic acid or from a carbamic or sulfamic acid and

X denotes hydrogen, halogen, alkoxy, aroxy, SO_3H or a heterocyclic group attached through —O— or —N<,

characterised in that a compound corresponding to Formula II



II

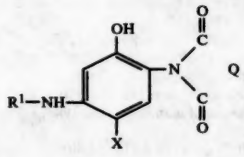
wherein

X has the meaning indicated and

Q denotes the group required for completing a dicarbonimide ring

is converted by reduction to the amino compound and acylation into a compound corresponding to Formula III

III



wherein

X, Q and R^1 have the meanings indicated, and in that the compound corresponding to Formula III is converted into the corresponding compound of Formula I by hydrazinolytic decomposition of the dicarbonimide ring.

4,873,339

CHIRAL BIOTIN PRECURSORS

John McGarrity; Leander Tenud, and Thomas Meul, all of Visp, Switzerland, assignors to Lonza Ltd., Gampel, Switzerland

Division of Ser. No. 127,052, Dec. 1, 1987. This application Nov. 30, 1988, Ser. No. 284,021

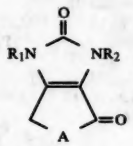
Claims priority, application Switzerland, Dec. 2, 1986, 4790/86

Int. Cl.[4] C07D *495/04, 491/048*

U.S. Cl. 548—110 **3 Claims**

1. An imidazole derivative of the formula:

IX



wherein R_1 is an (R)- or (S)-1-phenylalkyl group, an (R)- or (S)-1-alkoxycarbonyl-1-phenylmethyl group or an (R)- or (S)-1-aryloxycarbonyl-1-phenylmethyl group, and R_2 is hydrogen, a substituted or unsubstituted alkanoyl group, a substituted or unsubstituted benzoyl group, a substituted or unsubstituted benzyl group, an alkoxycarbonyl group, an aryloxycarbonyl group, an alkoxyalkyl group, a pyranyl group, a substituted or unsubstituted benzenesulfonyl group, an alkylsulfonyl group, a diarylphosphinyl group, a dialkoxyphosphinyl group or a trialkylsilyl group, and A is a sulfur or oxygen atom.

4,873,340

PROCESS FOR PREPARING 5-AROYL-1,2-DIHYDRO-3H-PYRROLO[1,2-a]PYRROLE-1,1-DICARBOXYLATES

Joseph M. Muchowski, Sunnyvale, and Robert Greenhouse, Cupertino, both of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

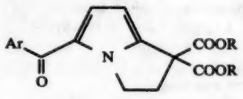
Filed May 29, 1986, Ser. No. 868,835

Int. Cl.[4] C07D *487/04, 498/04, 513/04*

U.S. Cl. 548—453 **25 Claims**

19. A process for preparing a compound of the formula

(I)



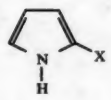
in which

R is lower alkyl; and

Ar is an aryl group not containing hydrogen bonded to a pyrrole nitrogen,

which comprises

(a) reacting a compound of the formula



in which

X is bromo or chloro,

with a compound of the formula

ArC(O)Q

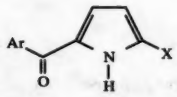
in which

Ar is as defined above; and

Q is the residue of a dialkylamine or a saturated cyclic amine,

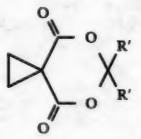
in the presence of an acid halide to afford a compound of the formula

(III)



(b) treating the compound of formula (III) with an alkali metal hydride in an aprotic organic solvent, followed by treatment with a compound of the formula

(VI)

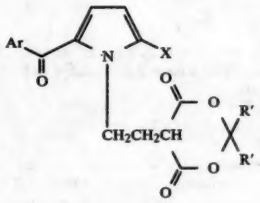


in which

each R′ is independently lower alkyl

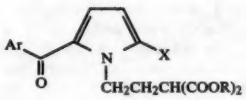
to afford a compound of the formula

(IV)



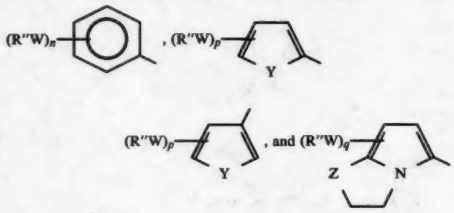
(c) treating the compound of formula (IV) with ROH, R being as defined above, in the presence of acid to afford a compound of the formula

(V)



(d) cyclization of the compound of formula (V).

20. The process of claim **19** wherein Ar is selected from the group consisting of



in which

R″ is H, lower alkyl, lower alkenyl, or lower alkynyl, optionally substituted by halogen;

W is a covalent bond, —O—, —S—, —S(O)—, —$S(O)_2$—, —NR—, —CHR—, —NO_2, fluoro, chloro, or bromo; except that if W is —NO_2, fluoro, chloro, or bromo, then R″ is absent;

Y is —O—, —S—, or —NR—;

Z is —O—, —S—, —S(O)—, —$S(O)_2$—, —NR″—, or —CHR″—;

n is 0 to 5;

p is 0 to 3; and

q is 0 to 2.

25. A process for preparing dimethyl 5-benzoyl-1,2-dihydro-3H-pyrrolo[1,2-a]pyrrole-1,1-dicarboxylate which comprises

(a) treating 2-(bromo or chloro)pyrrole with benzmorpholide in the presence of phosphoryl chloride;

(b) treating the resulting 5-benzoyl-2-(bromo or chloro)pyrrole with an alkali metal hydride in an aprotic organic solvent at a temperature between about 0°–40° C. for about 10 minutes to 10 hours, followed by treatment with a 6,6-di(lower alkyl)-5,7-dioxaspiro[2.5]octane-4,8-dione at a temperature between about 50°–100° C. for about 1–10 hours;

(c) treating the resulting intermediate with methanolic HCl at a temperature between about 0°–30° C. for about 5 minutes to 5 hours; followed by

(d) cyclizing the resulting intermediate with an alkali metal hydride in a polar aprotic organic solvent at a temperature between about 50°–150° C. for about 10 minutes to 10 hours in an inert atmosphere.

4,873,341

WHITE BIS-IMIDE FLAME RETARDANTS

Keith G. Anderson, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Sep. 19, 1988, Ser. No. 246,209

Int. Cl.[4] C07D *209/48*

U.S. Cl. 548—462 **14 Claims**

1. A method for producing a white or at least nearwhite product which predominantly contains alkylene(C_1–C_5)-bis-(tetrabromophthalimide), which product is produced from the yellow product produced by the reaction of tetrabromophthalic anhydride and diaminoalkane in the presence of water and an alkanoic acid, said method comprising:

(a) forming a solution which contains, as a solvent,

(i) SO_3 or fuming sulfuric acid, and

(ii) a haloalkane of the formula RX_n, wherein R is an alkyl group containing up to two carbon atoms, X is a halogen selected independently from Br and Cl, and n is 2 or 3 when R is an alkyl containing 1 carbon atom and is 1, 2 or 3 when R is an alkyl group containing 2 carbon atoms, and,

as a solute, said yellow product, and

(b) adding water to said solution to precipitate therefrom said white or at least near-white product.

4,873,342

DIPEPTIDE DERIVATIVE AND SYNTHESIS AND USE THEREOF

Takaharu Tanaka; Masayuki Saitoh; Naoki Higuchi, and Masaki Hashimoto, all of Osaka, Japan, assignors to Suntory Limited, Osaka, Japan

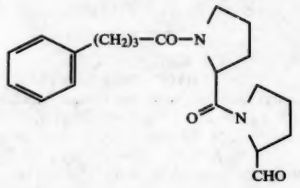
Filed Apr. 16, 1986, Ser. No. 852,710

Claims priority, application Japan, Apr. 16, 1985, 60-80871; Dec. 23, 1985, 60-290237

Int. Cl.[4] C07D *207/00*; A61K *31/40*

U.S. Cl. 548—518 **2 Claims**

2. An anti-amnesic agent comprising a pharmaceutically effective amount of a compound of the formula:



together with a pharmaceutically acceptable carrier.

4,873,343

PROCESS FOR THE PREPARATION OF N-(2-CHLOROBENZYL)-2-(2-THIENYL) ETHYLAMINE

Joël Radisson, Toulouse, France, assignor to Sanofi, Paris, France

Filed Nov. 23, 1988, Ser. No. 275,369

Claims priority, application France, Dec. 18, 1987, 87 17755

Int. Cl.[4] C07D *333/12*

U.S. Cl. 549—74 **9 Claims**

1. A process for the preparation of N-(2-chlorobenzyl)-2-(2-thienyl)ethylamine, wherein 2-thiophene acetonitrile is reacted with 2-chlorobenzylamine and hydrogen in the presence of a hydrogenation catalyst.

4,873,344

CYANO CONTAINING INDENE DERIVATIVES

Klaus P. Bogeso, Molleaaparken, and Michael B. Sommer, Markmandsgade, both of Denmark, assignors to H. Lundbeck A/S, Copenhagen-Valby, Denmark

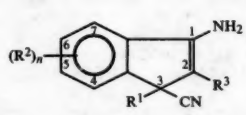
Filed Nov. 24, 1987, Ser. No. 124,820

Claims priority, application United Kingdom, Dec. 1, 1986, 8628644

Int. Cl.[4] C07C *121/64*; C07D *333/24*

U.S. Cl. 541—77 **9 Claims**

1. An indene derivative of the formula I:



I

wherein R^1 is

(a) phenyl or phenyl substituted with one or two groups selected from halogen, lower alkyl, lower alkoxy, lower alkylthio, lower alkylsulfonyl, dilower alkylamino, or carboxylic acid-derived acylamino, cyano, or trifluoromethyl, trifluoromethoxy,

(b) a bicyclic aromatic,

(c) a thiophene, or thiophene substituted with a substituent selected from halogen, lower alkyl, lower alkoxy, lower alkylthio, trifluoromethyl or trifluoromethoxy, and

R^2 is selected from H, halogen, lower alkyl, benzyl, lower

alkylthio, methoxy, lower alkylsulfonyl, dilower alkylsulfamoyl, carboxylic acid-derived acylamino, benzylamino, dilower alkylamino, cyano, trifluoromethyl and trifluoromethoxy,

R^3 is CN, $COOR^4$, $—CON(R^4)_2$ or COR^4, where R^4 is a lower alkyl group, and "n" is an integer of 1–3 inclusive.

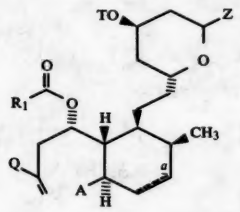
4,873,345

PROCESS FOR THE PREPARATION OF 5'-OXA, 5'-THIA, 5'-AZA HMG-COA REDUCTASE INHIBITORS

Mark E. Duggan, Wynnewood, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Filed Sep. 29, 1988, Ser. No. 250,525
Int. Cl.[4] C07D *309/10, 315/00*
U.S. Cl. 549—214 **14 Claims**

1. A compound of structural formula B:



B

wherein:

A is HO, SH or HN—R_N;

Q is CH_3, CH_2OT, or H;

T is H, tert-butyldimethylsilyl, tert-butyldiphenylsilyl, trimethylsilyl, triethylsilyl, triisopropylsilyl or tetrahydropyranyl;

Z is OCH_3, or Z together with the carbon to which it is attached represents C=O;

R_1 is selected from:

(1) C_{1-10} alkyl;

(2) substituted C_{1-10} alkyl in which one or more substituent(s) is selected from

(a) halogen,

(b) hydroxy,

(c) C_{1-10} alkoxy,

(d) C_{1-5} alkoxycarbonyl,

(e) C_{1-5} acyloxy,

(f) C_{3-8} cycloalkyl,

(g) phenyl,

(h) substituted phenyl in which the substituents are X and Y,

(i) C_{1-10} alkylS(O)$_n$ in which n is 0 to 2,

(j) C_{3-8} cycloalkylS(O)$_n$,

(k) phenylS(O)$_n$,

(l) substituted phenylS(O)$_n$ in which the substituents are X and Y, and

(m) oxo;

(3) C_{1-10} alkoxy;

(4) C_{2-10} alkenyl;

(5) C_{3-8} cycloalkyl;

(6) substituted C_{3-8} cycloalkyl in which one substituent is selected from

(a) C_{1-10} alkyl,

(b) substituted C_{1-10} alkyl in which the substituent is selected from

(i) halogen,

(ii) hydroxy,

(iii) C_{1-10} alkoxy,

(iv) C_{1-5} alkoxycarbonyl,

(v) C_{1-5} acyloxy,

(vi) phenyl,

(vii) substituted phenyl in which the substituents are X and Y

(viii) C_{1-10} alkylS(O)$_n$,

(ix) C_{3-8} cycloalkylS(O)$_n$,

(x) phenylS(O)$_n$,

(xi) substituted phenylS(O)$_n$ in which the substituents are X and Y, and

(xii) oxo,

(c) C_{1-10} alkylS(O)$_n$,

(d) C_{3-8} cycloalkylS(O)$_n$,

(e) phenylS(O)$_n$,

(f) substituted phenylS(O)$_n$ in which the substituents are X and Y,

(g) halogen,

(h) hydroxy,

(i) C_{1-10} alkoxy,

(j) C_{1-5} alkoxycarbonyl,

(k) C_{1-5} acyloxy,

(l) phenyl, and

(m) substituted phenyl in which the substituents are X and Y;

(7) phenyl;

(8) substituted phenyl in which the substituents are X and Y;

(9) amino;

(10) C_{1-5} alkylamino;

(11) di(C_{1-5} alkyl)amino;

(12) phenylamino;

(13) substituted phenylamino in which the substituents are X and Y;

(14) phenyl C_{1-10} alkylamino;

(15) substituted phenyl C_{1-10} alkylamino in which the substituents are X and Y;

(16) R_5S in which R_5 is selected from

(a) C_{1-10} alkyl,

(b) phenyl, and

(c) substituted phenyl in which the substituents are X and Y;

R_N is selected from:

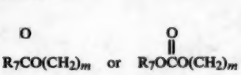
(a) C_{1-5}alkyl;

(b) phenylC_{1-5}alkyl;

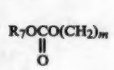
X and Y independently are hydrogen, halogen, trifluoromethyl, C_{1-3} alkyl, nitro, cyano or group selected from:

(1) $R_6O(CH_2)_m$ in which m is 0 to 3 and R_6 is hydrogen, C_{1-3}alkyl or hydroxy-C_{2-3}alkyl;

(2) $R_7CO(CH_2)_m$ or



in which R_7 is hydrogen, C_{1-3}alkyl, hydroxy-C_{2-3}alkyl, phenyl, naphthyl, amino-C_{1-3}alkyl, C_{1-3}alkylamino-C_{1-3}alkyl, di(C_{1-3}alkyl)amino-C_{1-3}alkyl, hydroxy-C_{2-3} alkylamino-C_{1-3}alkyl or di(hydroxy-C_{2-3}alkyl) amino-C_{1-3}alkyl; provided that in



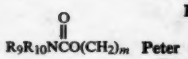
R_7 is not H;

(3)

in which R_8 is hydrogen, C_{1-3}alkyl, hydroxy-C_{2-3} alkyl, C_{1-3}alkoxy-C_{1-3}alkyl, phenyl or naphthyl;

(4)

-continued



in which R_9 and R_{10} independently are hydrogen, C_{1-3} alkyl, hydroxy-C_{2-3}alkyl

(5) $R_{11}S(O)_n(CH_2)_m$ in which R_{11} is hydrogen, C_{1-3}alkyl, amino, C_{1-3}alkylamino or di(C_{1-3}alkyl)amino;

a is a single bond or a double bond;

halogen is F or Cl;

n is 0 to 2.

4,873,346

SUBSTITUTED BENZOTHIAZOLES, BENZIMIDAZOLES, AND BENZOXAZOLES

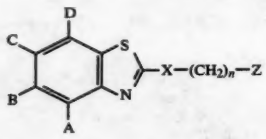
David J. Anderson, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Sep. 20, 1985, Ser. No. 778,340

Int. Cl.[4] C07D *417/12, 277/74*

U.S. Cl. 548—157 **5 Claims**

1. A compound according to the structural formula



wherein A, B, C and D are independently hydrogen or hydroxy provided that they are all not hydrogen;

X is O, S or NH; and

Z is

(1) exo or endo 2-norbornyl,
(2) 1-adamantyl,
(3) 3-cyclohexenyl,
(4) 2-cyclohexanolyl,
(5) 2-cyclohexanone,
(6) Cl,
(7) Br,
(8) CN,
(9) $OCOCH_3$,
(10) $COOCH_3$,
(11) C≡CH,
(12) CH═CH_2,
(13) CH═CH(C_1–C_4)alkyl,
(14) CH═CH-phenyl,
(15) CH(Br)CH_3,
(16) $CH(CH_3)$phenyl,
(17) $CH(CH_3)_p$-tolyl,
(18) phenyl unsubstituted or substituted at the 4 position with bromine or $COOCH_3$;
(19) benzoyl,
(20) toluyl,
(21) 2-naphthyl,
(22) 9-anthracenyl,
(23) 2-tetrahydrofuranyl,
(24) phthalimido,
(25) 2-benzimidazolyl,
(26) 2-mercapto-6-hydroxybenzothiazolyl, or
(27) 7-methoxy-coumarin-4-yl; and pharmaceutically acceptable salts thereof; wherein n is 4–11, except when Z is:

(a) exo or endo 2-norbornyl,
(b) 1-adamantyl,
(c) 3-cyclohexenyl,
(d) 2-cyclohexanolyl, or
(e) 2-cyclohexanone; then n is 0.

4,873,347

PROCESS FOR THE PREPARATION OF THE DEMALONYL COMPOUND OF MACROLIDE LACTONES

Peter Hammann, Kelkheim; Susanne Grabley, Königstein/-Taunus; Wolfgang Raether, Dreieich; Bernd Clommer, Kelkheim; Heinz Kluge, Hofheim am Taunus, and Burkhard Sachse, Kelkheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fankfurt am Main, Fed. Rep. of Germany

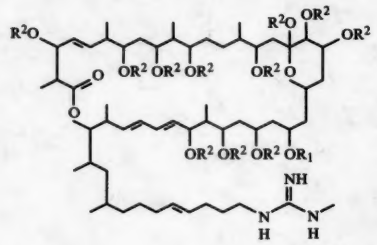
Filed Dec. 22, 1987, Ser. No. 136,768

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1986, 3644375; Jan. 8, 1987, 3700331

Int. Cl.[4] C07D *313/00*

U.S. Cl. 549—267 **9 Claims**

1. A process for the preparation of the demalonyl compound of macrolide lactones, which comprises hydrolysis, in the presence of a base, of the compound of the formula I



I

in which R^1 and R^2, independently of one another, are hydrogen or a malonyl group, not more than one R^2 substituent representing a malonyl group, excepting the compound of the formula I in which R^1 and all R^2 are simultaneously hydrogen.

4,873,348

OXYPRICIN, A NEW ANTIBIOTIC

Imre Szilágyi; Gyula Dékány; Judit Frank; Gábor Horváth, and Gábor Kulcsár, all of Budapest, Hungary, assignors to Chinoin Gyogyszer es Vegyeszeti Termekek Gyara R.T., Budapest, Hungary

PCT No. PCT/HU85/00034, § 371 Date Mar. 10, 1986, § 102(e) Date Mar. 10, 1986, PCT Pub. No. WO85/05621, PCT Pub. Date Dec. 19, 1985

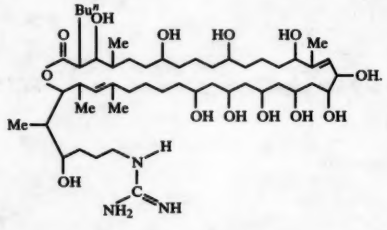
PCT Filed May 31, 1985, Ser. No. 834,333

Claims priority, application Hungary, May 31, 1984, 2125/84; Jul. 26, 1984, 2869/84

Int. Cl.[4] C07D *313/04*

U.S. Cl. 549—271 **5 Claims**

1. Oxypricin of the formula II



II

having an R_f value of 0.35 developed on thin-layer chromatoplate with a combined solvent system and having a molar weight of 946 determined by FAB-MS method or a pharmaceutically acceptable salt thereof.

4,873,349

RUTHENIUM CATALYST FOR BIARYLIC COUPLING; NEW STEGANOLIDES

Jean-Pierre Robin, and Yannick Landais, both of Le Mans, France, assignors to Universite Du Maine (Le Mans), Le Mans Cedex, France

PCT No. PCT/FR87/00055, § 371 Date Nov. 5, 1987, § 102(e) Date Nov. 5, 1987, PCT Pub. No. WO87/05289, PCT Pub. Date Sep. 11, 1987

PCT Filed Mar. 5, 1987, Ser. No. 127,898

Claims priority, application France, Mar. 6, 1986, 86 03152

Int. Cl.[4] C07D *307/93*

U.S. Cl. 549—298 15 Claims

1. A method for forming bridged biaryl compounds via the intramolecular biaryl coupling of compounds containing two aromatic rings, which may be polycondensed and which may contain one or more hetero atoms selected from oxygen and nitrogen, linked to each other at the ortho position via a straight-chain to branched, saturated or unsaturated hydrocarbon chain which may optionally contain one or more hetero atoms selected from oxygen and nitrogen, wherein the unbridged biaryl precursors are coupled in the presence of ruthenium (IV) tetrakis (trifluoroacetate) produced in situ by reacting trifluoroacetic acid with ruthenium dioxide RuO_2 in the presence of trifluoroacetic anhydride.

4,873,350

DISELENOBIS-BENZOIC ACID AMIDES OF PRIMARY AND SECONDARY AMINES AND PROCESSES FOR THE TREATMENT OF DISEASES IN HUMANS CAUSED BY A CELL INJURY

André Welter, Beyne-Heusay, Belgium; Harmut Fischer, Cologne, Fed. Rep. of Germany; Léon Christiaens, Nandrin, Belgium; Albrecht Wendel, Tübingen, Fed. Rep. of Germany; Eugen Etschenberg, Cologne, Fed. Rep. of Germany; Norbert Dereu, Frechen-Bachem, Fed. Rep. of Germany; Peter Kuhl, Bornheim, Fed. Rep. of Germany, and Eric Graf, Kerpen-Horrem, Fed. Rep. of Germany, assignors to A Nattermann & CIE GmbH, Cologne, Fed. Rep. of Germany

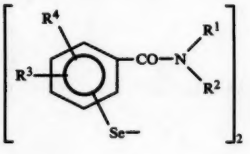
Continuation of Ser. No. 849,468, Apr. 8, 1986, abandoned. This application Oct. 3, 1988, Ser. No. 253,955

Claims priority, application Fed. Rep. of Germany, Apr. 12, 1985, 3513070; Apr. 12, 1985, 3513071

Int. Cl.[4] C07C *163/00*; A61K *31/165, 31/275, 31/245*

U.S. Cl. 549—436 3 Claims

1. Diselenobis-benzoic acid amides of the general formula (I):



(I)

wherein:

R^1 and R^2 which are identical or different from each other, represent members selected from the group consisting of hydrogen, straight C_{1-18}-alkyl, branched C_{1-18}-alkyl, C_{3-8}-cycloalkyl, C_{3-8}-cycloalkylmethyl, phenylalkyl, phenyl, phenyl substituted by one to three substituents, identical or different from each other, selected from the group consisting of halogen, C_{1-4}-alkyl, C_{1-4}-alkoxy, hydroxy, trifluoromethyl, nitro, di-(C_{1-4}-alkyl)-amino, cyano, carboxy, alkoxycarbonyl, alkoxycarbonylalkyl and methylenedioxy; and together a C_4–C_6-alkylene bridge, with the proviso that at least one of R^1 and R^2 is different from hydrogen, and

R^3 and R^4 which are identical or different from each other, represent members selected from the group consisting of hydrogen, halogen, C_{1-4}-alkyl, C_{1-4}-alkoxy, trifluoromethyl, nitro and together methylenedioxy,

the diseleno bridge in the molecule being positioned in the ortho-, meta- or para-position relative to the carbamido group.

4,873,351

METHOD FOR PREPARATION OF ANTIMONY MERCAPTIDES

Kohtaroh Fujita, Sakai; Toshio Wachi, Nara, and Yoshiaki Ikeda, Sakai, all of Japan, assignors to Sakai Chemical Industry Co., Ltd., Osaka, Japan

Filed Dec. 7, 1988, Ser. No. 280,851

Int. Cl.[4] C07F *9/90, 9/92*

U.S. Cl. 556—76 4 Claims

1. A method for preparation of antimony mercaptides of a general formula:

$$Sb(-SR^1)_3$$

where R^1 represents an alkyl, alkenyl, aryl, aralkyl, cycloalkyl or heterocyclic group having from 1 to 18 carbon atoms, or an alkyl, alkenyl, aryl, aralkyl, cycloalkyl or heterocyclic group having from 1 to 18 carbon atoms and having sulfide bond or ether bond in the group or having a hydroxyl group or a carboxyl group as a substituent, which comprises reacting antimony trioxide and an organic mercaptan of a general formula:

$$R^1—SH$$

where R^1 has the same meaning as above, in the presence of a lower aliphatic carboxylic acid.

4,873,352

TRANSPARENT AQUEOUS TIN COMPOUND SOLUTION

Toshiyuki Kobashi, and Hideo Naka, both of Okayama, Japan, assignors to Japan Exlan Company Limited, Osaka, Japan

Filed Feb. 4, 1987, Ser. No. 11,863

Claims priority, application Japan, Feb. 8, 1986, 61-26239; Feb. 8, 1986, 61-26240; Feb. 8, 1986, 61-26241

Int. Cl.[4] C07F *7/22*

U.S. Cl. 556—105 4 Claims

1. A transparent aqueous tin compound solution prepared by adding, under stirring, tin oxalate into an aqueous medium in such an amount that the tin oxalate is present in said aqueous medium in a concentration below 20% by weight and adding hydrogen peroxide in an amount of 1.6 to 2.2 mols per mol of tin oxalate to effect a reaction between the hydrogen peroxide and tin oxalate, said reaction taking place at a temperature below the boiling point of the aqueous reaction medium, and carrying out said reaction for 5 to 20 minutes.

4,873,353

PRECERAMIC COMPOSITIONS AND CERAMIC PRODUCTS

Leonard M. Niebylski, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Feb. 6, 1989, Ser. No. 306,097

Int. Cl.[4] C07F *7/08*

U.S. Cl. 556—402 20 Claims

1. A process which comprises mixing about 0.25–20 parts by weight of a trialkoxy-, triaryloxy-, or tri(arylalkoxy)boroxine with one part by weight of a polycarbosilane in an organic solvent.

4,873,354

IODOPHOR

Alfred R. Globus, 26-53 210th Street, Bayside, N.Y. 11360

Filed Apr. 21, 1988, Ser. No. 184,250
Int. Cl.[4] C07C *143/68*
U.S. Cl. 558—51 **6 Claims**

1.

An iodophor comprising the reaction product formed by reacting polyethylene glycol, an alkylarylsulfonate and iodine in the presence of water and propylene glycol as solvent wherein aryl designates benzene, naphthalene, toluene or xylene.

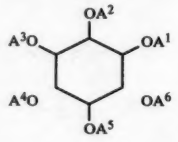
4,873,355

PROCESS FOR REGIOSELECTIVELY PREPARING PHOSPHORYLATED INOSITOLS AND OTHER CYCLITOLS

Frank W. Hobbs, and James L. Meek, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 29, 1987, Ser. No. 56,181
Int. Cl.[4] C07F *9/117*
U.S. Cl. 558—161 **37 Claims**

1. A myo-inositol poly(phosphate) of the formula



wherein

A^1 through A^6 are independently selected from the group consisting of

H,

a hydroxyl protecting group, and

$P(=O)(YR)(ZR^1)$,

where

R and R^1 are, independently, a phosphorus protecting group,

Y and Z are, independently, selected from the group consisting of O, S, and NR^2, where R^2 is aryl or a C_1–C_{15} staight chain, branched or cyclic alkyl where the alkyl may be internally interrupted by ether oxygen, provided that

three or four of A^1 through A^6 are $P(=O)(YR)(ZR^1)$.

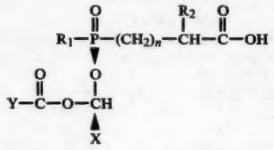
4,873,356

METHOD FOR PREPARING PHOSPHINIC ACIDS USED IN PREPARING ACE INHIBITORS AND INTERMEDIATES PRODUCED THEREBY

Edward W. Petrillo, Jr., Pennington; Donald S. Karanewsky, East Windsor; John K. Thottathil, Lawrenceville; James E. Heikes, East Windsor, and John A. Grosso, Princeton Junction, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Sep. 30, 1987, Ser. No. 102,694
Int. Cl.[4] C07F *9/32*
U.S. Cl. 558—180 **9 Claims**

1. A compound having the structure



including salts thereof, and all stereoisomers thereof, wherein

R_1 is lower alkyl, aryl, arylalkyl, cycloalkyl or cycloalkylalkyl;

R_2 is hydrogen, lower alkyl or arylalkyl;

X is hydrogen, lower alkyl or phenyl;

Y is hydrogen, lower alkyl, phenyl or alkoxy or together X and Y are $-(CH_2)_2$, $-(CH_2)_3-$, $-CH=CH$ or

and

n is 0 or 1.

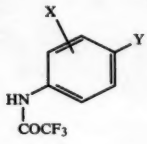
4,873,357

TRIFLUORO ACETYL-CYANO-ANILINE INTERMEDIATES FOR DOPAMINE-βHYDROXYLASE INHIBITORS

Carl Kaiser, Haddon Heights; Lawrence I. Kruse, Haddonfield, both of N.J., and Stephen T. Ross, Berwyn, Pa., assignors to SmithKline Beckman Corporation, Philadelphia, Pa.

Division of Ser. No. 793,512, Oct. 31, 1985, Pat. No. 4,719,223.
This application Oct. 8, 1987, Ser. No. 105,628
Int. Cl.[4] C07C *122/00, 157/07, 103/34*
U.S. Cl. 558—414 **6 Claims**

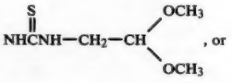
1. A compound having the formula:



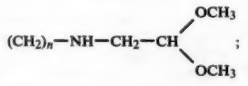
in which:

X is H, Br, Cl, F, I or any combination thereof of up to four substituents;

Y is CN, CHO,



, or



;

and

n is 1–5;

except compounds in which:

X is four H's; and

Y is CN or CHO.

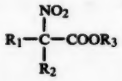
4,873,358

PREPARATION OF NITROESTERS VIA THE REACTION OF NITROPARAFFINS WITH CYANOFORMATES

Jennifer M. Quirk, Highland, and Charles G. Carter, Silver Spring, both of Md., assignors to W. R. Grace & Co.-Conn., New York, N.Y.

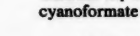
Filed Sep. 20, 1988, Ser. No. 246,609
Int. Cl.[4] C07C *79/41*
U.S. Cl. 560—22 19 Claims

1. A process for forming an alkyl nitroacetate represented by the formula:



wherein R_1 and R_2 each independently represent a hydrogen atom, an unsubstituted or substituted C_1–C_7 alkyl group or an unsubstituted or substituted phenyl group and R_3 is a C_1—C_4 alkyl group, comprising contacting in a liquid, a strong base, a nitroparaffin of the formula:

wherein R_1 and R_2 are the same as defined above, with a cyanoformate of the formula:



wherein R_3 is the same as defined above, an recovering the formed alkyl nitroacetate.

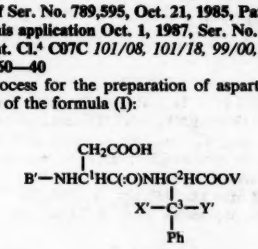
4,873,359

PROCESS FOR PREPARING AS PARTYL-PHENYLALANINE DIPEPTIDES

Alan B. Chmurny, Frederick; Akiva T. Gross, Rockville; Robert J. Kupper, Mount Airy, and Rowena L. Roberts, Derwood, all of Md., assignors to W. R. Grace & Co. - Conn., New York, N.Y.

Division of Ser. No. 789,595, Oct. 21, 1985, Pat. No. 4,710,583. This application Oct. 1, 1987, Ser. No. 103,635
Int. Cl.[4] C07C *101/08, 101/18, 99/00, 103/30*
U.S. Cl. 560—40 4 Claims

1. A process for the preparation of aspartylphenylalanine dipeptides of the formula (I):



(I)

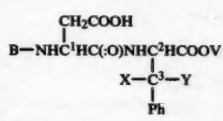
wherein B' is B or B replaced with a hydrogen atom; X' is X or X replaced with a hydrogen atom; Y' is Y or Y replaced with a hydrogen atom, with the proviso that at least one of X' and Y' is X or Y replaced by a hydrogen atom; B is hydrogen or Q; Q is an amino acid protective group; V represents hydrogen or an alkyl group having 1, 2, 3 or 4 carbon atoms; C^1 and C^2 are chiral carbon atoms having an S optical configuration; and

(a) Y is hydrogen and X is —OR', —SR', —OC(:O)R', —OC(:O)OR, —OC(:O)NHR', —OC(:S)SR, —Cl, —Br, —N_3, —OS(:O)(:O)—R, —S(:O) (:O)—R, —NHR', or —NO_2; or

(b) X and Y are independently —OR', —SR', RS(:O)(:O)—, —OC(:O)R', —NHR', or —Cl; or

(c) X and Y together are =O, —$S(CH_2)_nS$—, —$S(CH_2)_nO$—, —$O(CH_2)_nO$—, =NNHC(:O)NH_2, =NNHC(:O)R', RNHN=, TsNHN=, or =NOH;

where R' is H or R; R is alkyl or alkylene having 1, 2, 3, or 4 carbons, or substituted alkyl or substituted alkylene having 1, 2, 3, or 4 carbons; or aryl or substituted aryl; n is 1, 2, 3, or 4 and X and Y are interchangeable, comprising hydrogenating a compound of the formula (II):



(II)

wherein B, X, Y and V are as defined above at a temperature of from about 0° to 150° C. at a hydrogen pressure ranging from about atmospheric to 1500 psig in the presence of a catalyst selected from the group consisting of Pt, PtO_2, Pd black or $Pd(OH_2)$ on carbon, barium sulfate, or alumina, and Raney Ni or Raney Co to reductively cleave at least one of X and Y, and optionally B, from said compound of the formula (II), thereby forming said compound of formula (I).

4,873,360

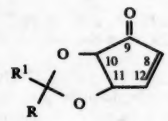
PROCESS FOR THE PREPARATION OF CYCLOPENTANOIDS AND NOVEL INTERMEDIATES PRODUCED THEREBY

Carl R. Johnson, and Thomas D. Penning, both of Detroit, Mich., assignors to Board of Governors of Wayne State University, Detroit, Mich.

Division of Ser. No. 883,993, Jul. 10, 1986, abandoned. This application Jan. 21, 1988, Ser. No. 146,716
Int. Cl.[4] C07C *177/00*
U.S. Cl. 560—121 10 Claims

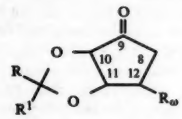
1. The process for the preparation of a cyclopentanoid (I) which comprises:

(a) reacting in an organic solvent at a reduced temperature less than ambient temperatures a compound of the formula:



including stereoisomers wherein R and R' CO— provide a protecting group for the C-11 oxygen group and the C-10 methylene group and with a compound of the formula:

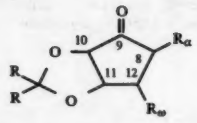
wherein $R_\omega Cu$ is a copper complex soluble in the organic solvent wherein R_ω is selected from alkyl and alkenyl groups containing 4 to 12 carbon atoms to form an intermediate of the formula:



(II)

including stereoisomers;

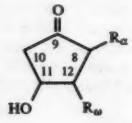
(b) reacting II with $R_\alpha X$ in an organic solvent wherein R_α is selected from alkenyl and alkynyl ester, ketone and amide groups containing 3 to 12 carbon atoms and X is a halogen selected from chloro- and iodo- and bromo-groups to form a compound of the formula:



(III)

including stereoisomers;

(c) reacting (III) in an aqueous organic solvent mixture with a metallic reducing agent to produce a compound of the formula:



(I)

including stereoisomers as the prostanoid (I).

4,873,361

PROCESS FOR PRODUCTION OF P-ACETOXYBENZOIC ACID FROM P-ACETOXYACETOPHENONE

Krisati A. Fjare, Naperville, Ill., assignor to Amoco Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 16,746, Feb. 19, 1987, abandoned. This application Aug. 29, 1988, Ser. No. 237,992

Int. Cl.[4] C07C *67/08*

U.S. Cl. 560—130 **17 Claims**

1. A semicontinuous or continuous liquid-phase process for the production of p-acetoxybenzoic acid from p-acetoxyacetophenone in high yield, which process comprises: (a) oxidizing in a reaction zone said p-acetoxyacetophenone with a source of molecular oxygen in the presence of a catalyst comprising cobalt (II), manganese (II), and bromine, in a solvent comprising a lower aliphatic carboxylic acid and in the presence of a promoter consisting essentially of an acid anhydride of said lower aliphatic carboxylic acid, at a temperature within the range of from about 200° F. to about 400° F. and at a pressure of from 1 atmosphere to about 30 atmospheres, said promoter being present as an initial reactor charge in a mole ratio of promoter to said p-acetoxyacetophenone of from 1:1 to 2.4:1; (b) adding said promoter to said reaction zone during said oxidizing in an amount of from 0.25 to 1.5 moles of said promoter per mole of said p-acetoxyacetophenone, the total amount of promoter resulting from the initial charge and subsequent addition of said promoter providing a mole ratio of said promoter to said p-acetoxyacetophenone that is in the range of about 1.6:1 to 3:1 moles of said promoter per mole of said p-acetoxyacetophenone; (c) evaporating the reactor effluent to remove water and said lower aliphatic carboxylic acid therefrom; (d) recovering said lower aliphatic carboxylic acid that has been removed from said effluent; (e) recycling to a make-up vessel the lower aliphatic carboxylic acid that has been recovered from said effluent; (f) filtering the evaporator bottoms to recover reactor product from mother liquor; and (g) recycling said mother liquor to said reaction zone.

4,873,362

PREPARATION OF 2-SUBSTITUTED 4-ACYLOXY-2-BUTENALS

Franz Merger, Frankenthal; Rolf Fischer, Heidelberg, and Hans Horler, Darmstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

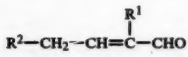
Filed Nov. 2, 1987, Ser. No. 115,891

Claims priority, application Fed. Rep. of Germany, Nov. 20, 1986, 3639562

Int. Cl.[4] C07C *67/00*

U.S. Cl. 560—238 **12 Claims**

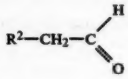
1. A process for preparing a 2-substituted 4-acyloxy-2-butenal of formula I:



(I)

where R^1 is alkyl of 1 to 12 carbon atoms which may be substituted by cycloaliphatic, phenyl, anisyl, or heterocyclic radicals, by alkenyl or alkynyl or by hydroxyl, ether, thioether, acetoxy acyl, acetoxy alkylamino, carboxyl or carbalkoxy, and R^2 is acyloxy of 1 to 12 carbon atoms, which comprises:

reacting an acyloxyacetaldehyde of formula II:



(II)

where R^2 has the abovementioned meaning, with an aldehyde of formula III:

(III)

where R^1 has the abovementioned meaning, in the presence of a linear or cyclic secondary amine and of a mono- or dicarboxylic acid at from 20° to 100° C.

4,873,363

PROCESS FOR THE PREPARATION OF 3-(4'-BROMOBIPHENYL-4-YL)TETRALIN-1-ONE

In O. Kim, and Sang G. Lee, both of Seoul, Rep. of Korea, assignors to Korea Advanced Institute of Science and Technology, Rep. of Korea

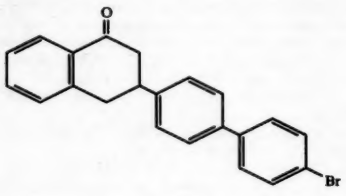
Filed May 11, 1988, Ser. No. 192,776

Claims priority, application Rep. of Korea, Sep. 24, 1987, 10603/1987

Int. Cl.[4] C07C *45/45*

U.S. Cl. 568—319 **8 Claims**

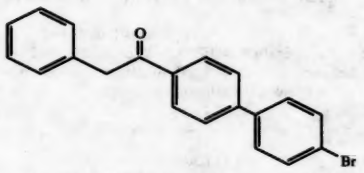
1. A process for the production 3-(4'-bromobiphenyl)-4-yl)tetralin-1-one of the formula IV, consisting essentially of:



IV

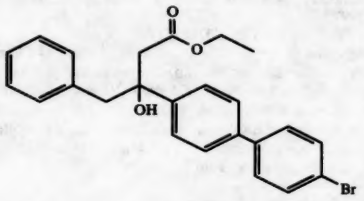
reacting a compound of formula I with ethyl bromoacetate in

the presence of a mixed solvent, to form a compound of formula II;



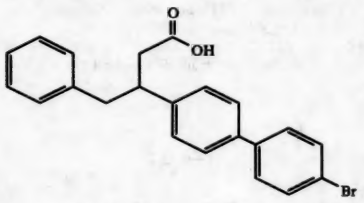
I

reacting the compound of formula II with trialkylsilane and trifluoracetic acid in the presence of sulfate salt and a catalytic amount of boron trifluoride etherate wherein alkyl is 1–2 carbon atoms, to form a compound of formula III; and,



II

obtaining the compound of formula IV by the cyclization reaction of the compound of formula III in the presence of polyphosphoric acid in a suitable solvent:



III

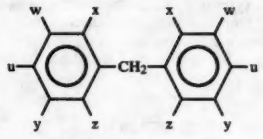
4,873,364

PROCESS FOR THE PREPARATION OF METHYLENE DIPHENYLENE DIISOCYANATES AND POLYMETHYLENE POLYPHENYLENE POLY (DIISOCYANATES)

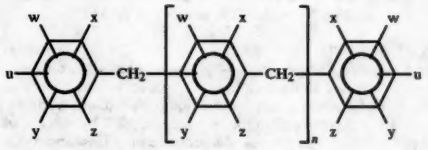
Edward T. Shawl, Wallingford, and Haven S. Kesling, Jr., Drexel Hill, both of Pa., assignors to Arco Chemical Technology, Inc., Wilmington, Del.

Filed Dec. 9, 1988, Ser. No. 283,430
Int. Cl.[4] C07C *118/00*
U.S. Cl. 560—344 **12 Claims**

1. A process for the preparation of a methylene diphenylene diisocyanate or a polymethylene polyphenylene poly (diisocyanate) which comprises heating at a temperature within the range of from about 50° C. to about 220° C. a methylene diphenylene bis (dialkylurea) having the formula



or a polymethylene polyphenylene poly (dialkylurea) having the formula



wherein at least one of the substituents u, w, x, y and z on the ring is a dialkylureido (—NHCONRR') group and the other substituents which may be the same or different on the ring, are hydrogen, an ether group or a nitro group, R and R' of the dialkylureido group which may be the same or different are an alkyl group having indepedently from 1 to 8 carbon atoms and n is an integer of from 1 to 8, dissolved or slurried in an organic solvent or mixture of solvents, in the presence of a tertiary amine hydrohalide as a promoter to convert the urea to the corresponding diisocyanate, and thereafter separating and recovering the diiscoayanate or poly (diisocyanate).

4,873,365

PROCESS FOR THE PREPARATION OF ISOPHORONE DIISOCYANATE FROM ISOPHORONE DICARBAMYL ESTERS USING HIGHLY SELECTIVE SNO_2 OR CUO CATALYSTS

Yuhshi Luh, Orange, and Peter S. Forgione, Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed Apr. 4, 1986, Ser. No. 848,417
Int. Cl.[4] C07C *119/00*
U.S. Cl. 560—345 **9 Claims**

1. In a process for the preparation of isophorone diisocyanate by cleaving a corresponding biscarbamic acid ester at a temperature of 175° C. to 400° C. in the presence of a metal oxide catalyst, the improvement which comprises using SnO_2 or CuO or a mixture thereof as said catalyst to produce said isophorone diisocyanate with high selectivity and high yield.

4,873,366

PROCESS FOR PRODUCING 2,6-NAPHTHALENEDICARBOXYLIC ACID

Toshiharu Matsuda; Atsushi Sasakawa; Shoichiro Hayashi, all of Iwaki, and Yutaka Konai, Machida, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 5, 1988, Ser. No. 177,774
Claims priority, application Japan, Apr. 7, 1987, 62-85198
Int. Cl.[4] C07C *51/265*
U.S. Cl. 562—416 **2 Claims**

1. A process for producing 2,6-naphthalenedicarboxylic acid which comprises oxidizing 2,6-diisopropylnaphthalene or its partially oxidized intermediate with molecular oxygen in a solvent containing at least 50% by weight of an aliphatic monocarboxylic acid having not more than three carbon atoms in the presence of a catalyst composed of

(i) a heavy metal comprising cobalt, manganese or their mixture, and

(ii) bromine, and a salt of an inorganic acid, having an acid dissociation constant Ka smaller than 1.34×10^{-5}, at 25°

C., and a vapor pressure lower than that of said aliphatic monocarboxylic acid used as the solvent, which is selected from the group consisting of sodium tetraborate, ammonium tetraborate, potassium tetraborate, sodium molybdate, sodium phosphate, and disodium hydrogen phosphate.

4,873,367

METHOD FOR PREPARING 4-HYDROXY-3-PHENYLBENZOIC ACID

Patricia P. Anderson, Worthington, Mass.; Timothy M. Sivavec, Clifton Park, and Tohru Takekoshi, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Nov. 25, 1988, Ser. No. 275,881

Int. Cl.[4] C07C *51/15*

U.S. Cl. 562—425 **17 Claims**

1. A method for preparing 4-hydroxy-3-phenylbenzoic acid which comprises contacting a mixture of an anhydrous alkali metal salt of 2-phenylphenol and a liquid N,N-dialkylcarboxamide, said mixture containing up to about 50% by weight of said salt, with carbon dioxide at a pressure of at least about one atmosphere and a temperature in the range of about 70°–150° C., and neutralizing the salt thus formed.

4,873,368

PROCESS FOR PRODUCING ACRYLIC ACID

Koju Kadowaki; Kohei Sarumaru, both of Ami, and Takeshi Shibano, Yokkaichi, all of Japan, assignors to Mitsubishi Petrochemical Company Limited, Tokyo, Japan

Continuation of Ser. No. 203,592, Nov. 3, 1980, abandoned. This application Sep. 29, 1982, Ser. No. 426,273

Claims priority, application Japan, Nov. 19, 1979, 54-149871

Int. Cl.[4] C07C *51/25, 57/05*

U.S. Cl. 562—532 **7 Claims**

1. In a process for producing acrylic acid by a two-stage gas-phase catalytic oxidation comprising subjecting a gas mixture containing propylene, molecular oxygen, and steam to a first-stage catalytic oxidation reaction thereby to convert propylene principally into acrolein and subjecting the gases formed in the first-stage catalytic oxidation reaction to a second-stage catalytic oxidation reaction thereby to convert the acrolein principally into acrylic acid, the improvement wherein said process is carried out under the conditions comprising:

A. carrying out at least the first-stage catalytic oxidation reaction in a reaction zone defined by the conditions

(1) that said reaction zone comprises a plurality of elongated unit reaction zones extending in the direction of flow of the gases and connected in parallel arrangement,

(2) that each of the unit reaction zone comprises a reaction region comprising a bed of oxidation catalyst capable of a one pass yield of at least about 88% for the sum of the quantities of acrolein and acrylic acid at a reaction temperature of about 280° to 350° C. and a cooling region comprising a bed of a solid inactive material disposed contiguously to the reaction on the downstream side thereof, and

(3) that the temperatures of the reaction region and of the cooling region are respectively controlled independently;

B. that the gases to be subjected to the first-stage catalytic oxidation reaction satisfy the conditions:

that the mol ratio of molecular oxygen/propylene is 1.17 to 1.66, that the mol ratio of steam/propylene is equal to or less than 4,

that the propylene concentration is 7 to 15 percent, and

that the gas pressure is 0.4 to 1.5 kg./cm.^{2} gage;

C. that the gases formed in the reaction regions of the unit reaction zones by the first-stage catalytic oxidation are quenched to a temperature of 280° C. or lower in the cooling region; and

D. that the gases formed in the first-stage catalytic oxidation reaction to be subjected to the second-stage catalytic oxidation reaction are conditioned by adding a gas mixture of molecular oxygen and steam to satisfy the conditions:

that the mol ratio of molecular oxygen/propylene is 1.75 to 2.5,

that the mol ratio of steam/propylene is 1 to 5, and

that the gas temperature is 280° C. or lower, the mol ratios being based on respective total quantities including those of the gases subjected to the first-stage catalytic oxidation reaction.

4,873,369

PURIFICATION OF CYCLOHEXANONE OXIME CONTAINING AMMONIUM SULFATE

Hugo Fuchs, Ludwigshafen, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Mar. 5, 1987, Ser. No. 22,235

Claims priority, application Fed. Rep. of Germany, Mar. 11, 1986, 3607997

Int. Cl.[4] C07C *131/00*

U.S. Cl. 564—264 **3 Claims**

1. A process for the purification of cyclohexanone oxime containing from 5 to 8% by weight of water and containing from 10 to 1000 mg of ammonium sulfate per kg of cyclohexanone oxime, wherein the cyclohexanone oxime in the molten state is passed over an acidic ion exchanger and a basic ion exchanger at a temperature from 70° to 95° C.

4,873,370

ALKYLENE DIAMINES FOR USE IN FRICTION AND WEAR REDUCING COMPOSITIONS

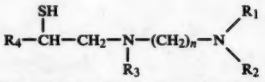
I-Ching Chiu, Houston, Tex., assignor to Pennzoil Products Company, Houston, Tex.

Filed Mar. 3, 1987, Ser. No. 21,316

Int. Cl.[4] C07C *61/16*; C10M *105/08*

U.S. Cl. 564—500 **10 Claims**

1. N,N-dialkyl-N'-(beta substituted) alkyl alkylene diamine of the formula



wherein R_1, R_2 and R_3 are C_{1-4} hydrocarbon groups or H, but both R_1 and R_2 are not H, R_4 is a saturated or unsaturated C_{14-24} hydrocarbon group, and n=1–4.

4,873,371

HYDROXY-TERMINATED ARYLENE ETHERS, AND METHOD FOR MAKING

Gary W. Yeager, Schenectady, and David N. Schissel, Clifton Park, both of N.Y., assignors to General Electric Company, Schnectady, N.Y.

Filed Aug. 1, 1988, Ser. No. 226,594

Int. Cl.[4] C07C *43/295*

U.S. Cl. 568—33 **10 Claims**

1. A method for making a hydroxy-terminated arylene ether of the formula

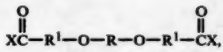
HO—R1—O—R—O—R1—OH,

comprising,

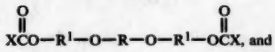
(1) reacting a dihydroxyaromatic compound of the formula,

HOROH

and with an arylcarbonyl compound selected from aldehydes and ketones having a leaving group in the para position, selected from fluoro, bromo, and nitro to form an arylene ether dicarbonyl adduct of the formula,



(2) oxidizing the resulting arylene ether dicarbonyl adduct of step (1) to form the corresponding arylene ether diester of the formula,



(3) saponifying the arylene ether diester of step (2) to the corresponding hydroxy-terminated arylene ether,

where R is a substituted or unsubstituted arylene radical having from 6–36 carbons, R^1 is the same or different arylene radical having from 6–20 carbons and X is hydrogen or an arylene group having from 6–14 carbons.

4,873,372

ISOLATION OF 4,4'-DICHLORODIPHENYL SULFONE

Gerhard Schaefer, Heidelberg; Heinz Eilingsfeld, Frankenthal; Peter Neumann, Wiesloch, and Michael Stumpp, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jan. 25, 1988, Ser. No. 148,386

Int. Cl.[4] C07C *147/06*

U.S. Cl. 568—34 **6 Claims**

1. A process for the isolation of 4,4'-dichlorodiphenyl sulfone from a substantially water-free mixture containing dichlorodiphenyl sulfones in which the ratios of the masses of 2,4'-dichlorodiphenyl sulfone and 3,4'-dichlorodiphenyl sulfone to the mass of 4,4'-dichlorodiphenyl sulfone are respectively from 0.5% to 20% and from 0.5% to 30%, which process comprises:

treating the mixture with an alkanol at temperatures of from 20° C. to 250° C. under substantially water-free conditions in such a manner that dissolution in the alkanol is as complete as possible, cooling the resultant substantially water-free mixture to precipitate pure 4,4'-dichlorodiphenyl sulfone, and finally separating the 4,4'-dichlorodiphenyl sulfone.

4,873,373

PROCESS FOR PREPARATION OF 3-PHENOXYBENZYL 2-(4-ALKOXYPHENYL)-2-METHYLPROPYL ETHERS

Mitsumasa Umemoto; Tamotsu Asano; Hironobu Horie; Akinobu Takagi; Nobuyasu Tamura, and Takeshi Nishida, all of Fukuoka, Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

PCT No. PCT/JP86/00198, § 371 Date Jul. 16, 1986, § 102(e) Date Jul. 16, 1986, PCT Pub. No. WO86/06367, PCT Pub. Date Nov. 6, 1986

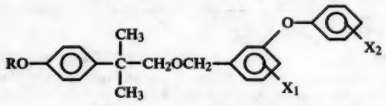
PCT Filed Apr. 18, 1986, Ser. No. 890,143

Claims priority, application Japan, Apr. 19, 1985, 60-82661

Int. Cl.[4] C07C *41/24*

U.S. Cl. 568—637 **7 Claims**

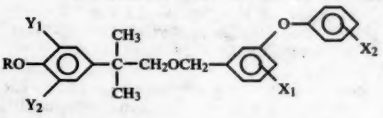
1. A process for the preparation of 3-phenoxybenzyl 2-(4-alkoxyphenyl)-2-methylpropyl ethers represented by the following formula (I):



(I)

wherein R represents a lower alkyl group, and

X_1 and X_2 represent a hydrogen atom or fluorine atom, which comprises subjecting a 3-phenoxybenzyl 2-(4-alkoxy-3-halogenophenyl-2-methylpropyl ether or 3-phenoxybenzyl 2-(4-alkoxy-3,5-dihalogenophenyl)-2-methylpropyl ether represented by the following formula (II):



(II)

wherein R stands for a lower alkyl group, X_1 and X_2 represent a hydrogen atom or fluorine atom, and Y_1 and Y_2 represent a hydrogen atom, chlorine atom, bromine atom or iodine atom, with the proviso that at least one of Y_1 and Y_2 is a chlorine atom, bromine atom or iodine atom, to dechlorination, debromination or deiodination by hydrogenation in the presence of a dehydrohalogenating base in an amount of 1 to 10 moles per mole of the compound of formula (II), wherein the dechlorination, debromination or deiodination is carried out in the presence of a hydrogenation catalyst by using as a hydrogenative reducing agent a lower aliphatic alcohol in an amount of at least 0.3 mole of the stoichiometric amount per mole of the compound of formula (II) and an alkali compound selected from alkali metal hydroxides in an amount effective to form three moles of hydrogen for each mole of the lower aliphatic alcohol, said amount being at least 0.6 moles for each mole of the compound of formula (II), without introducing hydrogen from outside of the reaction system.

4,873,374

PREPARATION PROCESS OF 4,4'-BIPHENOL, PRECURSOR OF SAME AND PREPARATION PROCESS OF PRECURSOR

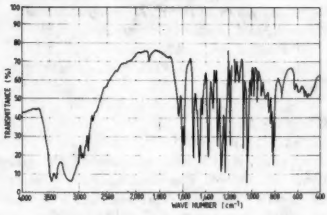
Tohru Miura; Teruyuki Nagata; Koju Okazaki; Masayuki Furuya, and Emiko Nishida, all of Ohmuta, Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Filed Apr. 6, 1988, Ser. No. 178,301

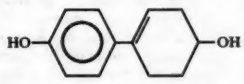
Claims priority, application Japan, Apr. 14, 1987, 62-89890; Dec. 18, 1987, 62-318701

Int. Cl.[4] C07C *39/17*

U.S. Cl. 568—743 **1 Claim**



1. 4-(4-Hydroxyphenyl)-3-cyclohexene-1-ol having the formula (I):



(I)

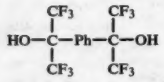
4,873,375

PROCESS FOR PREPARING FLUORINE-SUBSTITUTED ALICYCLIC DIOL

Motonobu Kubo, and Yoshiki Shimizu, both of Osaka, Japan, assignors to Daikin Industries, Ltd., Osaka, Japan

Filed Apr. 11, 1988, Ser. No. 180,118
Claims priority, application Japan, Apr. 11, 1987, 62-89283
Int. Cl.[4] C07C *33/44*
U.S. Cl. 568—812 10 Claims

1. A process for preparing a fluorine-substituted alicyclic diol comprising reacting a fluorine-substituted aromatic diol represented by formula (I):

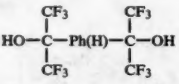


(I)

wherein Ph represents a divalent organic group selected from the group consisting of a phenylene group, a biphenylene group, a terphenylene group, a phenyleneoxy-phenylene group, a phenylenethiophenylene group, a phenylenealkylenephenylene group, an anthrylene group, a phenanthrylene group and said divalent organic group or which at least one hydrogen atom of said group is substituted by a methyl group, a hydroxyl group, an amino group or a halogen atom, in which the alkylene group contained in said group represented by Ph has from 1 to 10 carbon atoms with hydrogen in the presence of a rhodium catalyst;

at a temperature in the range of from 10° to 250° C. under a hydrogen pressure in the range of from 1 to 250 kg/cm^2 G;

to obtain said fluorine-substituted alicyclic diol represented by formula (II):



(II)

wherein Ph(H) represents the corresponding fully hydrogenated Ph group.

4,873,376

PROCESS FOR THE PRODUCTION OF MONOMERIC ALKENYLPHENOLS FROM DIHYDROXYDIPHENYLALKANES

Ralf Dujardin, and Wolfgang Ebert, both of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen Bayerwerk, Fed. Rep. of Germany

Filed Jun. 20, 1988, Ser. No. 209,200
Claims priority, application Fed. Rep. of Germany, Jul. 2, 1987, 3721853
Int. Cl.[4] C07C *37/52, 37/50*
U.S. Cl. 568—806 6 Claims

1. A process for the production of monomeric alkenylphenols from dihydroxydiphenylalkanes in the presence of basic catalysts which comprise oxides, hydroxides or carbonates of alkali metals or alkaline earth metals, alkali metal salts of phenols or alkali metal salts of mildly acidic fatty acids, wherein a solution of dihydroxydiphenylalkane and a water-miscible organic solvent, which is oligomeric 1,2-(C_2–C_4)-alkylidene glycols, di- and trialkanolamines or N-alkyl lactams, is continuously introduced into an organic reaction medium containing the basic catalyst under reduced pressure and at elevated temperature of from 150° to 250° C. at such a rate that the initial volume of the reaction medium increases by up to 10% by volume and the cleavage products are continuously distilled off together with the solvent from the reaction system into a water-filled receiver from which the monomeric alkenylphenol is then isolated and the phenol formed as secondary product and the solvent remain dissolved in the aqueous phase.

4,873,377

PREPARATION OF DIBROMONEOPENTYL GLYCOL

John Y. Lee, and Edgar E. Spielman, Jr., both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Oct. 3, 1988, Ser. No. 251,787
Int. Cl.[4] C07C *31/42*
U.S. Cl. 568—844 10 Claims

1. A process for preparing dibromoneopentyl glycol, which process comprises:

(a) brominating pentaerythritol with HBr to yield a reaction mass containing dibromoneopentyl glycol and lesser amounts of monobromopentaerythritol and tribromoneopentyl alcohol, said bromination occurring in the presence of a catalyst selected from the group consisting of mono- or di-carboxylic acids, their anhydrides, their esters, and mixtures thereof, and in the presence of a substantially inert solvent, which solvent has, at the temperature to which the reaction mass is cooled in (d), a solubility for said tribromoneopentyl alcohol greater than that for said dibromoneopentyl glycol;

(b) maintaining in the reaction mass at least a major portion of the by-product water formed by the bromination in (a);

(c) neutralizing the reaction mass;

(d) cooling said reaction mass sufficiently to form a precipitate which is predominant in said dibromoneopentyl glycol; and

(e) recovering said precipitate from the reaction mass.

4,873,378

PROCESS FOR MAKING 1,3-DIOLS FROM EPOXIDES

Mark A. Murphy, Corpus Christi; Brad L. Smith, Portland; Adolfo Aguilo', and Kwoliang D. Tau, both of Corpus Christi, all of Tex., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Continuation-in-part of Ser. No. 898,072, Aug. 20, 1986, abandoned. This application Dec. 15, 1987, Ser. No. 133,116
Int. Cl.[4] C07C *29/36, 31/20*
U.S. Cl. 568—867 28 Claims

1. A single-step process for manufacturing 1,3-propanediol with CO and H_2 in a ether reaction solvent, said process being characterized by reacting a reaction mixture comprising (1) ethylene oxide at a concentration from about 0.01 to about 30 weight percent; (2) rhodium at a molar concentration from about 0.00001 to about 0.1 molar; (3) a phosphine having the formula

$$PR_1R_2R_3 \qquad \text{III}$$

wherein R_1, R_2, and R_3 are independently selected, from the group consisting of aliphatic and aromatic hydrocarbon groups, the molar ratio of rhodium to phosphine being from about 10:1 to about 1:10; (4) water in an amount up to about 25 weight percent based on the weight of the reaction mixture; (5) CO; (6) H_2; and (7) an acid, the molar ratio of acid to phosphine being from about 10:1 to about 1:10; wherein the molar ratio of CO to H_2 is from about 10:1 to about 1:10, and wherein the reaction takes place at a temperature from about 50 to about 200° C. under a pressure from about 200 to about 10,000 psig, for a period of time which is sufficient to form.

4,873,379

PROCESS FOR MAKING 1,3-DIOLS FROM EPOXIDES

Mark A. Murphy, Corpus Christi, Tex., assignor to Hoechst Celanese Corporation, Sommerville, N.J.

Filed May 25, 1988, Ser. No. 198,364
Int. Cl.[4] C07C *27/20, 27/22, 29/00*
U.S. Cl. 568—867 7 Claims

1. A single-step process for manufacturing 1,3-propanediol from ethylene oxide with CO and H_2 in an ether reaction

solvent, said process being characterized by reacting a reaction mixture comprising (1) ethylene oxide at a concentration from about 0.01 to about 30wt. %; (2) rhodium at a molar concentration from about 0.00001 to about 0.1 molar; (3) an alkali metal compound in a concentration of from about 0.00001 molar to about 0.1 molar; (4) water in an amount up to about 25 wt. % based on the weight of the reaction mixture; (5) CO; and (6) H_2; wherein the molar ratio of CO to H_2 is from about 1:1 to about 1:5, and wherein the reaction takes place at a temperature from about 50° to about 200° C. under a pressure from about 200 to about 10,000 psig, for a period of time which is sufficient to form 1,3-propanediol.

4,873,380
CATALYST FOR REMOVING PEROXIDE CONTAMINANTS FROM TERTIARY BUTYL ALCOHOL

John R. Sanderson, Leander, and John M. Larkin, Austin, both of Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Jan. 20, 1987, Ser. No. 4,508
Int. Cl.[4] C07C *29/88, 27/26*
U.S. Cl. 568—914 **7 Claims**

1. In a method for enhancing the motor fuel quality of a tertiary butyl alcohol feedstock contaminated with tertiary butyl hydroperoxide, ditertiary butyl hydroperoxide, acetone, methanol and isobutylene, wherein said tertiary butyl hydroperoxide and said ditertiary butyl peroxide are converted to tertiary butyl alcohol by heating the contaminated tertiary butyl alcohol feedstock, the improvement comprising the steps of:

a. contacting said feedstock in a reaction zone with a catalyst at a temperature to about 80° to about 200° C. for a period of time sufficient to substantially selectively reduce said tertiary butyl hydroperoxide and said ditertiary butyl hydroperoxide to tertiary butyl alcohol, and

b. recovering from the products of said reaction a tertiary butyl alcohol product containing not more than about 100 ppm of tertiary butyl hydroperoxide, not more than about 100 ppm of ditertiary butyl peroxide, not more than about 1 wt. % of isobutylene and not more than about 3 wt. % each of acetone and methanol,

c. said catalyst consisting essentially of a catalyst composed of the oxides of nickel, copper, chromium and barium.

4,873,381
HYDRODEHALOGENATION OF CF_3CHCLF IN THE PRESENCE OF SUPPORTED PD

Carl S. Kellner, and V. N. Mallikarjuna Rao, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 20, 1988, Ser. No. 199,811
Int. Cl.[4] C07C *17/24, 19/02*
U.S. Cl. 570—176 **6 Claims**

1. A process for the preparation of 1,1,1,2-tetrafluoroethane comprising contacting in the gaseous phase at a temperature of 200° C. to 350° C. 1,1,1,2-tetrafluoromonochloroethane with H_2 in the presence of a catalyst consisting essentially of palladium on an aluminum fluoride or fluorinated alumina support.

4,873,382
PURIFICATION OF TELOMERS PREPARED FROM CHLOROTRIFLUOROETHYLENE AND TRICHLOROTRIFLUOROETHANE

Bobby F. Dannels; Deborah J. Olsen, both of Grand Island, and John Forcucci, Niagara Falls, all of N.Y., assignors to Occidential Chemical Corporation, Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 116,843, Nov. 5, 1987. This application Aug. 22, 1988, Ser. No. 234,645
Int. Cl.[4] C07C *17/24, 17/38, 19/08*
U.S. Cl. 570—177 **11 Claims**

1. A process for purifying a mixture of telomers prepared by reacting chlorotrifluoroethylene with $CF_2ClCFCl_2$, said telomers having the formula $CF_2ClCFCl(CF_2CFCl)_nCl$, where n is in the range of 1 to 10, said process comprising the steps of

(a) reacting the telomer mixture with an aqueous solution of potassium hydroxide in the presence of a quarternary ammonium compound,

(b) separating and removing impurities from the telomer mixture of step (a),

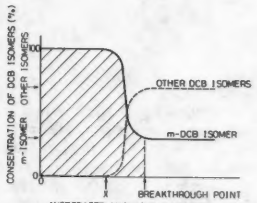
(c) reacting the telomer mixture from step (b) with potassium permanganate in a solvent in the presence of a quarternary ammonium compound, and

(d) recovering a purified telomer mixture.

4,873,383
METHOD FOR SELECTIVE ISOLATION OF DICHLOROBENZENE

Toshitaka Kaneshiki; Osamu Narukawa; Tadayoshi Haneda, and Toshiyuki Endo, all of Koriyama, Japan, assignors to Hodogaya Chemical Co., Ltd., Tokyo, Japan

Filed Jan. 29, 1988, Ser. No. 150,400
Claims priority, application Japan, Feb. 10, 1987, 62-27169
Int. Cl.[4] C07C *17/38*
U.S. Cl. 570—211 **16 Claims**



1. A method for a selective isolation of m-dichlorobenzene comprising the steps of:

bringing an isomeric mixture containing m-dichlorobenzene and at least one member selected from o- and p-dichlorobenzenes into contact with an absorbing material comprising a TPZ-3 type zeolite consisting essentially of at least one aluminosilicate compound of the formula (I):

$$M_{2/n}O \cdot Al_2O_3 \cdot \underline{x}SiO_2 \cdot \underline{m}H_2O \quad (I)$$

wherein M represents a member selected from monovalent and divalent cations, n represents an integer of 1 when M represents a monovalent cation, or of 2 when M represents a divalent cation, $\underline{x}$ represents an integer of 10 or more, and $\underline{m}$ represents zero or an integer of 1 or more, to cause the o- and p-dichlorobenzene in the isomeric mixture to be selectively absorbed by the absorbing material; and

collecting the selectively non-absorbed fraction of the isomeric mixture.

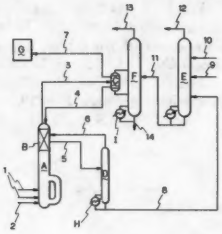
4,873,384
METHOD FOR PRODUCING DICHLOROETHANE

Shun Wachi; Yuusaku Ariki, both of Takasago, and Hiroshi Oshima, Kobe, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 105,496, Oct. 2, 1987, abandoned, which is a continuation of Ser. No. 830,801, Feb. 19, 1986, abandoned. This application Apr. 14, 1989, Ser. No. 338,538
Claims priority, application Japan, Feb. 19, 1985, 60-31261; Apr. 9, 1985, 60-76277; May 22, 1985, 60-111047
Int. Cl.[4] C07C *17/02, 19/045, 17/38*
U.S. Cl. 570—247 **4 Claims**

1. A method of producing dichloroethane which comprises feeding ethylene and chlorine into a liquid reaction medium

containing dichloroethane as a main component in a reactor which comprises a reaction zone and a gas-liquid contact device at the top part of the reactor above said reaction zone, reacting the ethylene and chlorine in the reaction zone of the reactor at a temperature which is not lower than the boiling point of dichloroethane at atmospheric pressure, to produce dichloroethane and to generate a vapor of the reaction medium, leading the reaction medium vapor through said gas-liquid contact device at the top of the reactor to a heat giving side of an exchanger whose heat receiving side is utilized as a reboiler for a distillation column, thereby condensing the reaction medium vapor and recovering the latent heat resulting from condensation of the vapor in the heat exchanger, returning the resulting condensate of the reaction medium vapor from the heat exchanger to said gas-liquid contact device of the reactor, thereby said condensate is brought into contact with the reaction medium vapor, removing as a product a part of the condensate subsequently to its contact with the reaction medium vapor, while conducting the remainder of the condensate subsequently to its contact with the reaction medium vapor to the reaction zone of the reactor, and purifying in said distillation column at least one member selected from the group consisting of dichloroethane produced by the reaction of ethylene and chlorine, dichloroethane produced in a separate process of oxychlorination of ethylene, and uncracked dichloroethane recovered in a separate process of thermally cracking dichloroethane.



4,873,385

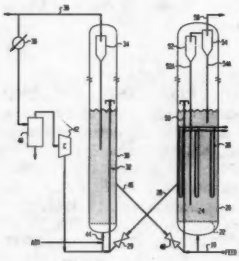
SINGLE ZONE OLIGOMERIZATION OF LOWER OLEFINS TO DISTILLATE UNDER LOW SEVERITY IN A FLUID BED WITH TAILORED ACTIVITY

Amos A. Avidan, Yardley, and David L. Johnson, Glen Mills, both of Pa., assignors to Mobil Oil Corp., New York, N.Y.

Continuation-in-part of Ser. No. 6,407, Jan. 23, 1987, Pat. No. 4,746,762. This application May 23, 1988, Ser. No. 197,543

Int. Cl.[4] C07C *2/12*

U.S. Cl. 585—415 **12 Claims**



1. A catalytic process for converting an essentially C_3+olefin feedstream to distillate in a fluid bed of catalyst, said process comprising,

(a) equilibrating said fluid bed of catalyst which consists essentially of finely divided medium pore zeolite metallosilicate particles having a constraint index in the range from 1 to 12, said bed having an average activity, alpha, in the range from about 2 to 10, said bed consisting essentially of preselected weight fractions of low activity catalyst particles adding up to about 90% by weight having an alpha no greater than 10, the remaining less than 10% by weight having an alpha greater than 10;

(b) contacting said olefin feedstream with said catalyst maintained as a dense fluid-bed operating in a single zone turbulent regime at superatmospheric pressure but below about 2800 kPa (400 psig) and a temperature above the dewpoint of the hydrocarbon mixture in the bed at operating pressure,

(c) flowing said olefin feedstream through said bed at a weight hourly space velocity (WHSV) in the range from about 0.05 to about 5 hr^{-1},

(d) maintaining a catalyst fines content of from about 10% to about 25% by wt, based on the weight of the catalyst in the bed, said fines having a particle size less than 32 microns, and,

(e) converting at least 80% by wt of said feedstream to olefins in a product which is essentially free of aromatics, with a yield per pass of about 20 percent by weight of said distillate.

4,873,386

SELECTIVE PRODUCTION OF 2,6-DIETHYLNAPHTHALENE

Gary P. Hagen, Glen Ellyn, and Thomas E. Nemo, Naperville, both of Ill., assignors to Amoco Corporation, Chicago, Ill.

Filed Jun. 28, 1988, Ser. No. 212,518

Int. Cl.[4] C07C *5/22*

U.S. Cl. 585—471 **11 Claims**

1. A method for producing 2,6-diethylnaphthalene, comprising: reacting in the liquid phase at least one of naphthalene or 2-ethylnaphthalene as the feed with at least one of 1,2,4-triethylbenzene, at least one tetraethylbenzene or pentaethylbenzene as the ethylating agent at a level of from about 1 to about 10 moles of the ethylating agent per mole of the feed by weight, in the presence of a Lewis acid catalyst selected from the group consisting of aluminum chloride, aluminum bromide, boron trichloride, tantalum pentachloride, antimony pentafluoride, and red oil, at a level of from about 0.01 to about 1 mole of the catalyst per mole of the feed by weight and at a temperature in the range of from about −10° C. to about 100° C.

4,873,387

PROCESS FOR THE ISOMERIZATION OF AROMATICS

J. W. Adriaan Sachtler, Des Plaines, and R. Joe Lawson, Palatine, both of Ill., assignors to UOP, Des Plaines, Ill.

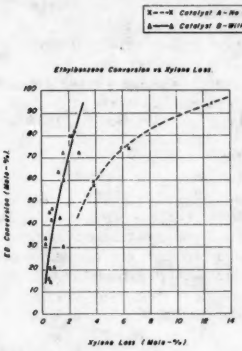
Division of Ser. No. 107,604, Oct. 13, 1987. This application Dec. 21, 1988, Ser. No. 287,351

Int. Cl.[4] C07C *5/22*

U.S. Cl. 585—482 **9 Claims**

1. A process for the isomerization of isomerizable alkylaromatic hydrocarbons and conversion of ethylbenzene which comprises contacting alkylaromatic hydrocarbons in a reaction

zone at isomerization reaction conditions with a hydrocarbon conversion catalyst useful for isomerizing isomerizable alkylar-



omatic hydrocarbons comprising a pentasil zeolite, a Group VIII metal component, and a bismuth component.

4,873,388

OXIDATIVE CONVERSION OF METHANE TO ETHYLENE AND ETHANE

Eric Shutt, Oxon, United Kingdom; Andries G. Altena, Hengelo Ov., Netherlands, and John W. Jenkins, Berks, United Kingdom, assignors to Johnson Matthey Public Limited Company, London, England

Filed Aug. 13, 1987, Ser. No. 84,809

Claims priority, application United Kingdom, Aug. 13, 1986, 8619717

Int. Cl.[4] C07C *2/00*

U.S. Cl. 585—500 **9 Claims**

1. A method for the oxidative conversion of methane to ethylene, ethane or mixtures thereof in which a mixture comprising methane and oxygen is heated to an operative temperature of from 500° to 1000° C. and the heated mixture is contacted with a catalyst system which comprises a first support component which is a non-reducible metal compound and which first component is substantially refractory at the operative temperature and a second component which is one or more oxycompounds selected from the group consisting of boron and phosphorus supported on the surface of the first component.

4,873,389

CONVERSION OF LIGHT OLEFINS TO GASOLINE USING LOW-TEMPERATURE CATALYST REGENERATION

Amos A. Avidan, Yardley, and David L. Johnson, Glen Mills, both of Pa., assignors to Mobil Oil Corp., New York, N.Y.

Filed Aug. 4, 1988, Ser. No. 228,147

Int. Cl.[4] C07C *2/02*

U.S. Cl. 585—533 **17 Claims**

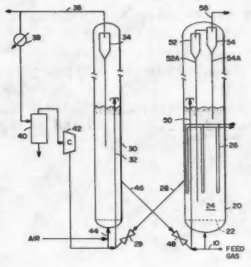
1. A fluidized bed catalytic process for conversion of light olefinic gas feedstock comprising at least 2 mol % ethene and a total C_2–C_3 alkene content about 10 to 75 wt %, comprising the steps of

(a) maintaining a fluidized bed of zeolite catalyst particles in a turbulent reactor bed at a temperature of about 315° to 510° C., said catalyst having an apparent particle density of about 0.9 to 1.6 g/cm^3 and a size range of about 1 to 150 microns, and average catalyst particle size of about 20 to 100 microns containing about 10 to 25 wt. % of fine particles having a particle size less than 32 microns;

(b) passing hot feedstock vapor upwardly through the fluidized catalyst bed in a single pass under turbulent flow conditions at reaction severity conditions sufficient to convert at least about 70% of feedstock ethene whereby said catalyst is deactivated;

(c) maintaining turbulent fluidized bed conditions through the reactor bed between transition velocity and transport velocity at a superficial fluid velocity of about 0.3 to 2 meters per second;

(d) recovering hydrocarbon product containing a major amount of C_4+ hydrocarbons and containing propane and propene in the ratio of about 0.2:1 to 5:1 in the substantial absence of added feedstock propane;



(e) withdrawing at least a portion of said deactivated catalyst from said reactor bed;

(f) maintaining a fluidized bed of deactivated catalyst in a turbulent regenerator bed at a temperature between 400° to 482° C.;

(g) passing oxygen-containing gas upwardly through the fluidized bed or deactivated catalyst at a rate sufficient to maintain the catalyst in a state of turbulent fluidization whereby the deactivated catalyst is regenerated;

(h) withdrawing regenerated catalyst from the regenerator bed; and

(i) returning the regenerated catalyst to the reactor bed.

4,873,390

CHEMICAL CONVERSION PROCESS

Jeffrey M. O. Lewis, Charleston, and Joe B. Price, Hamlin, both of W. Va., assignors to UOP, Des Plaines, Ill.

Filed Jul. 7, 1987, Ser. No. 70,575

Int. Cl.[4] C07C *1/00, 1/24*

U.S. Cl. 585—638 **16 Claims**

1. A process for catalytically converting a feedstock containing one or more compounds selected from the group consisting of alcohols, halides, mercaptans, sulfides, amines, ethers, and carboxyl compounds, said compounds having from 1 to about 4 carbon atoms per molecule, into a product containing light olefins which comprises:

(a) contacting said feedstock with a crystalline microporous three dimensional solid catalyst comprising a silicoaluminophosphate molecular sieve having pores with diameters of less than 5 Angstroms, said contacting being at conditions effective to convert said feedstock into said product and to form carbonaceous deposit material on said solid catalyst;

(b) contacting said carbonaceous deposit material-containing solid catalyst with regeneration medium at conditions effective to remove only a portion of said carbonaceous deposit material from said solid catalyst to form a partially regenerated solid catalyst having from about 2% to about 30% by weight of said carbonaceous deposit material and providing improved selectivity to said product relative to said solid catalyst containing less carbonaceous deposit material; and

(c) repeating step (a) using as said solid catalyst in step (a) at

least a portion of said solid catalyst previously subjected to step (b).

4,873,391

PROCESS FOR PRODUCING ISOBUTYLENE

Kazutaka Inoue; Toshihiro Sato, and Masao Kobayashi, all of Hiroshima, Japan, assignors to Mitsubishi Rayon Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 80,008, Jul. 31, 1987, abandoned. This application Aug. 17, 1988, Ser. No. 235,694
Claims priority, application Japan, Aug. 6, 1986, 61-184961
Int. Cl.[4] C07C *1/24*
U.S. Cl. 585—639 10 Claims

1. A process for producing isobutylene by dehydration of a feed gas of t-butyl alcohol of at least 90% of purity or its aqueous solution in gaseous phase on a fixed-bed type silica-alumina catalyst at a temperature in the range of 100°–210° C., wherein water vapor is added to feed gas and at an intermediate portion of said fixed bed catalyst and at least the last half of the catalyst located near the outlet end of the fixed-bed of catalyst is diluted with a carrier which has lower activity than the used catalyst.

4,873,392

CATALYTIC CONVERSION OF AQUEOUS ETHANOL TO ETHYLENE

Raymond Le Van Mao, St-Laurent, Canada, assignor to Concordia University, Montreal, Canada

Filed Apr. 25, 1988, Ser. No. 185,911
Int. Cl.[4] C07C *6/00*
U.S. Cl. 585—640 3 Claims

1. A process for converting diluted ethanol to ethylene which comprises:

(a) heating an ethanol-containing fermentation broth thereby to vaporize a mixture of ethanol and water,

(b) contacting said vaporized mixture with a ZSM-5 zeolite catalyst having a Si/Al ratio from 5 to 50 and impregnated with 0.5 to 7 wt % of triflic acid, and

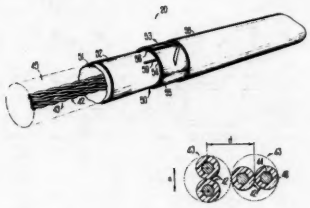
(c) recovering the ethylene thus produced.

4,873,393

LOCAL AREA NETWORK CABLING ARRANGEMENT

Harold W. Friesen, and Wendell G. Nutt, both of Dunwoody, Ga., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Mar. 21, 1988, Ser. No. 170,500
Int. Cl.[4] H01B *11/04*
U.S. Cl. 174—34 11 Claims



1. A cabling media which is suitable for balanced mode transmission with relatively low crosstalk, said cabling media comprising:

a first pair of conductors; and

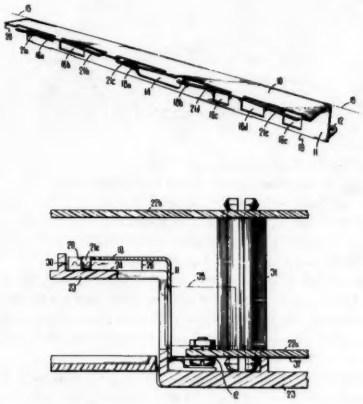
at least two other pairs of conductors being adjacent to said first pair, each pair including two plastic-insulated metallic conductors which are twisted together in accordance with a twist frequency spacing such that increments of the twist frequency spacing as between adjacent pairs are non-uniform and such that the twist length of each pair does not exceed the product of about forty and the outer diameter of an insulated conductor of said each pair.

4,873,394

RECEPTACLE PANEL FOR ELECTRONIC DEVICE PROVIDING SIMPLE ASSEMBLY AND RFI SUPPRESSION

Vikram Bhargava, Alpharetta, and James R. Heberling, Lawrenceville, both of Ga., assignors to Hayes Microcomputer Products, Inc., Norcross, Ga.

Filed Jun. 3, 1988, Ser. No. 202,084
Int. Cl.[4] H05K *9/00*
U.S. Cl. 174—35 R 8 Claims



5. Apparatus for mounting in an enclosure of the type having at least one receptacle opening and means defining a conductive surface of said enclosure proximate said receptacle opening, said enclosure being for housing electronic apparatus which emits radio frequency energy over a spectrum characterized by a predetermined highest frequency of interest, comprising in combination:

an elongated plate of electrically conductive material having respective first and second edges;

means for mounting said plate to said electronic apparatus such that, when said electronic apparatus is assembled within said enclosure, said second edge overlaps a conductive surface of said enclosure at said receptacle opening;

grounding means for providing an electrical ground connection between said strip and said electronic apparatus; and

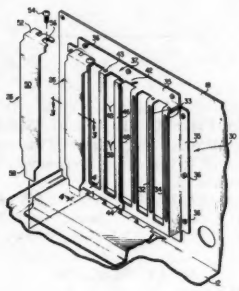
at least one elongated finger formed at said second edge to provide a discontinuity in said second edge, said finger being substantially parallel to said second edge and of a length substantially equal to a predetermined fraction of the wavelength of said predetermined highest frequency of interest.

4,873,395

PERSONAL COMPUTER EXPANSION SLOT SEAL AND METHOD

Thomas R. Mast, Austin, Tex., assignor to CompuAdd Corporation, Austin, Tex.

Filed Nov. 14, 1988, Ser. No. 270,266
Int. Cl.[4] H05K *9/00*
U.S. Cl. 174—35 GC 11 Claims



1. An improved personal computer chassis, wherein the improvement comprises:

at least one expansion slot on a base for receiving electronic circuit cards, said slot having edges;

at least one expansion slot cover;

a spring-loaded retainer fixed to said base to bias said slot cover against said expansion slot edges; and

an expansion slot seal disposed between said expansion slot edges and said slot cover such that said retainer forces said cover into said seal, and said seal into said slot edges, to retard the escape of radio frequency from the chassis.

4,873,396

WALL ELECTRICAL COVER PLATE

Hossein F. Guity-Mehr, Long Beach, Calif., assignor to Texim International, Irvine, Calif.

Filed Apr. 21, 1988, Ser. No. 184,411
Int. Cl.[4] H05K *5/03*
U.S. Cl. 174—66 2 Claims

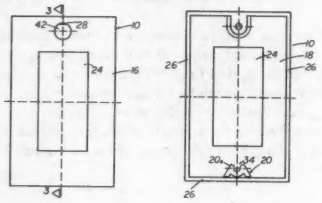
1. A wall cover plate for covering prior art electrical wiring devices and the like, said cover plate comprising:

a front surface farthest from the wall after installation;

a back surface opposite the front surface, part of which back surface defines an M-groove near the center bottom of said back surface, said M-groove capable of mating with a

protruding screw coupled to an electrical wiring device installed on the wall;

an interior surface communicating between front and back surfaces and defining only one screw groove oriented such that coupling the M-groove to one of the two screws protruding from a prior art installed electrical wiring device such as a switch permits the second of said two



electrical wiring device screws to pass through the center of the screw groove, which screw groove has a diameter just slightly greater than the diameter of the electrical wiring device screw; and

a screw groove cover removably coupling to said screw groove to cover the head of the screw therethrough after installation.

4,873,397

ELECTRONIC CIRCUIT ELEMENT

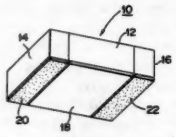
Sho Masujima; Hiroshi Yagi; Atsuzo Tamashima, and Jun Tamashima, all of Tokyo, Japan, assignors to TDK Corporation, Tokyo, Japan

Filed Dec. 28, 1987, Ser. No. 138,237

Claims priority, application Japan, Dec. 25, 1986, 61-200044[U]; Mar. 25, 1987, 62-43693[U]; Mar. 25, 1987, 62-43694[U]

Int. Cl.[4] H05K *1/18*

U.S. Cl. 174—117 A **10 Claims**



1. A surface-mounted-type electronic circuit element adapted to be mounted on a printed circuit board, comprising:

an element body having a surface opposed to the printed circuit board when mounted thereon;

two external terminals mounted at two ends of said element body;

adhesive means provided on said surface opposite to the printed circuit board, said adhesive means being formed of a material which exhibits adhesion only when it is heated; and

a solder layer provided on a surface of each said external terminal, which is opposite to said printed circuit board, said solder layer being formed of a solder material which effects soldering at a temperature of about 100° C. and is remelted at a temperature of at least about 130° C.

4,873,398

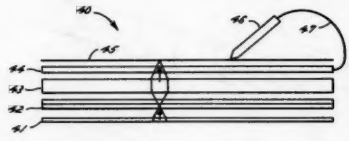
FLAT PANEL DISPLAY WITH INTEGRATED DIGITIZING TABLET

Laurence M. Hubby, Jr., Palo Alto, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jun. 30, 1988, Ser. No. 213,756

Int. Cl.[4] G08C *21/00*; G03B *21/14*

U.S. Cl. 178—18 **14 Claims**



1. A flat panel display comprising:

a screen;

means for projecting an image; and

a substantially thin lens for focusing said image on said screen.

4,873,399

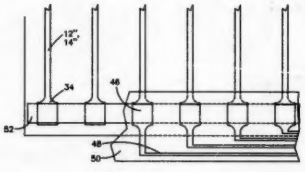
INK-ON-GLASS DIGITIZER TABLET AND METHOD OF CONSTRUCTION

Waldo L. Landmeier, Scottsdale, Ariz., assignor to Calcomp Inc., Anaheim, Calif.

Filed Dec. 20, 1988, Ser. No. 286,700

Int. Cl.[4] G08C *21/00*

U.S. Cl. 178—18 **13 Claims**



1. A digitizer tablet structure comprising:

(a) a glass substrate having top and bottom surfaces;

(b) a plurality of parallel, spaced conductive ink first conductors disposed on said top surface of said substrate, said first conductors terminating in conductive ink pads adjacent a side edge of said substrate;

(c) a plurality of parallel, spaced conductive ink second conductors disposed on said bottom surface of said substrate perpendicular to said first conductors, said second conductors terminating in conductive ink pads adjacent another side edge of said substrate;

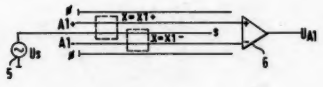
(d) a flexible connector strip containing a plurality of flexible conductors terminating in conductive pad ends disposed with said pad ends over respective ones of said conductive ink pads; and,

(e) electrically conductive adhesive means disposed between respective ones of said conductive pad ends and said conductive pad end's associated said conductive ink pad.

4,873,400
MANUALLY ACTIVATED POSITION INDICATOR

Werner Rapp, Geislingen; Walter Link, Rutesheim, and Giovanni Quinzio, Stuttgart, all of Fed. Rep. of Germany, assignors to Euchner & Co., Fed. Rep. of Germany

Filed Jul. 8, 1988, Ser. No. 216,294
Claims priority, application Fed. Rep. of Germany, Jul. 10, 1987, 3722890
Int. Cl.[4] G08C *21/00*
U.S. Cl. 178—19 13 Claims

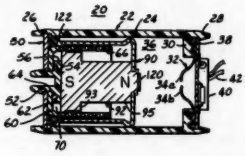


1. A manually activated position indicator with electrical output signals, comprising:
(a) a plurality of adjacent electrodes (S, A1−, A1+, B1−, B1+, Ax−, Ax+, Bx−, Bx+, Ay−, Ay+, By−, By+), which are electrically insulated from one another and are covered on one side by an electrically insulating layer (3) the side of which opposite said electrodes is provided as a support surface for a finger (4) of the user of said position indicator wherein;
(b) said electrodes form at least three groups;
(c) all of the electrodes (S) of a first group are connected to a voltage source (5) that delivers an alternating voltage (Us);
(d) the electrodes of the other groups are connected to a signal evaluating circuit; and
(e) at least one electrode of said other groups is arranged adjacent to an electrode (S) of the first group.

4,873,401
ELECTROMAGNETIC DAMPED INERTIA SENSOR

John A. Ireland, Chatham, Canada, assignor to Bendix Electronics Limited, Chatham, Canada

Filed Sep. 19, 1988, Ser. No. 246,588
Int. Cl.[4] H01H *35/14*
U.S. Cl. 200—61.45 M 18 Claims

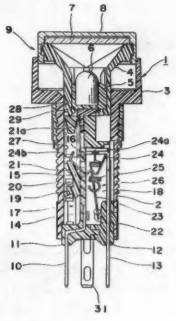


1. A sensor comprising:
a housing;
an inertial mass that moves within said housing from a first position to a second position in response to an acceleration or deceleration signal of predetermined amplitude and duration in a sense urging said inertial mass toward the second position;
first means for indicating that the inertial mass has moved to the second position; and
second means, comprising a magnet and an electrical conductor, said magnet serving to hold said inertial mass in the first position until occurrence of such a signal, and said magnet and said conductor serving for generating an electro-magnetic force which is in response to motion of said inertial mass toward the second position and acts to dampen the motion of the inertial mass, one of said magnet and said electrical conductor being movable with said inertial mass and the other of said magnet and said electrical conductor being affixed to said housing.

4,873,402
PUSH-BUTTON SWITCH WITH PLUNGER AND SWITCHING MECHANISM

Sueaki Honda, Kurayoshi; Mitsuji Hayashi, Nagaokakyo; Takashi Niwa, Kyoto; Akihiko Hayakawa, Kyoto, and Hideyuki Bingo, Uji, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Division of Ser. No. 67,391, Jun. 26, 1987, Pat. No. 4,516,630, which is a continuation of Ser. No. 816,619, Jan. 6, 1986, abandoned. This application Sep. 16, 1988, Ser. No. 245,278
Claims priority, application Japan, Jan. 8, 1985, 60-1337; Jan. 8, 1985, 60-1338; Jan. 9, 1985, 60-1304; Jan. 9, 1985, 60-1305
Int. Cl.[4] H01H *9/00*
U.S. Cl. 200—283 3 Claims



1. A push-button switch, comprising:
a housing;
a base fixed to said housing;
a plunger mechanism movable within said housing;
a switching mechanism disposed within said housing which is movable between an on and an off state;
an operating member which moves in association with said plunger mechanism so as to move said switching mechanism between the on and the off state; and
a fixed terminal fixed to said base and being of an inverted L-shape having a curved corner portion;
wherein said operating member has through-hole located at one end thereof through which an end portion of said fixed terminal extends, and wherein said fixed terminal has a shoulder portion which engages with opposing side edges of said through-hole

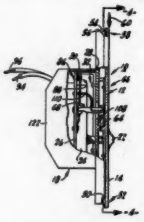
4,873,403
ON-OFF SWITCH SYSTEM FOR A PAIR OF CONDUCTORS

Richard Counts, Dallas, and Rob Pritchett, Carrollton, both of Tex., assignors to Prescolite, Inc., San Leandro, Calif.

Continuation of Ser. No. 47,046, May 5, 1987. This application Jul. 28, 1988, Ser. No. 225,533
Int. Cl.[4] H01H *9/12*
U.S. Cl. 200—330 8 Claims

1. An ON-OFF switch system comprising:
a. first and second electrical conduits mechanically connected to a support element, said support element having an electrical terminal distinct from said first and second electrical conduits;
b. a first plate, said first plate including a first side and a second side, said second side of said first plate including an appendage;

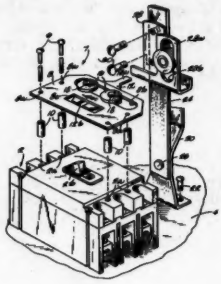
c. a second plate including a first side and a second side and further including an opening therethrough;
d. means for linearly sliding said first plate relative to said second plate with said second side of said first plate being removably maintained in facing relationship with said first side of said second plate;
e. first and second electrical contact members for electrical linkage to said first and second electrical conduits, said first electrical contact member being mechanically connected to said support element, said support element being mechanically connected to said second plate, said second electrical contact member being movable relative to said first electrical contact member;
f. an arm contacting said movable second electrical contact member, said arm extending through said opening in said



second plate and into engagement with said appendage of said first plate, for movement with said linearly sliding first plate, said movement of said arm effecting movement of said movable second electrical contact member relative to said first electrical contact member to effect electrical switching therebetween; and
g. a first electrical conductor extending to said appendage and being supported thereat, said arm including a second electrical conductor mounted thereto and electrically connected to said terminal of said support element, said second conductor electrically contacting said first conductor, said movement of said arm with said linear sliding of said first plate moving said first and second conductors relative to one another while maintaining said electrical contact between said first and second electrical conductors.

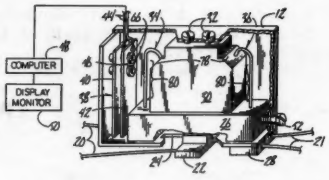
4,873,404
LOW-FRICTION DRIVE LINK FOR AUXILIARY HANDLE OPERATION TO MOLDED CASE CIRCUIT BREAKER CONNECTION
Ronald J. Fritsch, Sussex, Wis., assignor to Eaton Corporation, Cleveland, Ohio
Filed Aug. 17, 1988, Ser. No. 233,102
Int. Cl.[4] H01H *25/00*
U.S. Cl. 200—332 **6 Claims**

1. A low-friction drive link connecting auxiliary handle operator means to a molded case circuit breaker, said circuit breaker having a constituent operating handle and a superstructure supporting a linearly reciprocally movable slide disposed over said operating handle, said slide having a projection disposed transversly to direction of movement of said slide, said handle operator means having a drive lever pivotally supported at one side of said circuit breaker and movable in a plane parallel to a plane of movement of said circuit breaker operator handle, said drive lever including means defining an elongated opening oriented angularly to said direction of movement of said slide at each possible position of said drive lever, said projection extending within said opening, and roller means disposed over said projection, said roller means having



a peripheral surface in rolling engagement with edges of said opening.

4,873,405
SWITCHING DEVICE
Gerald A. Parks, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa
Division of Ser. No. 882,310, Jul. 7, 1986, Pat. No. 4,755,642.
This application Jan. 11, 1988, Ser. No. 141,824
The portion of the term of this patent subsequent to Jul. 5, 2005, has been disclaimed.
Int. Cl.[4] H01H *15/12*
U.S. Cl. 200—547 **7 Claims**

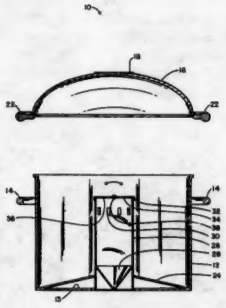


1. A switching device for attachment to a human's skin to close and open in response to contraction or expansion of the skin, the switching action producing signals which can be directed to a computer device to produce communications and instructions comprising:
a block means;
a carriage means attached to the block means by spring means, said spring means being resilient to bias the carriage means in a first position spaced apart from the block means;
a first connecting means extending between the carriage means and a first skin attachment means;
a second connecting means attached between said block means and a second skin attachment means;
at least one switch means positioned adjacent to the carriage means and being responsive to movement of the carriage means away from the first position;
so that sufficient movement of the first skin attachment means with respect to the second skin attachment means by contraction or expansion of the skin at or around the first and second skin attachment means causes movement of the carriage means from the first position, in turn causing switching action of the switching means.

4,873,406
MICROWAVE POPCORN POPPER

Gary L. Connor, HC 01 P.O. Box 74, Coulee DAM, Wash. 99116

Filed Dec. 23, 1988, Ser. No. 289,054
Int. Cl.[4] H05B *6/80*; A23L *1/18*
U.S. Cl. 219—10.55 E 11 Claims

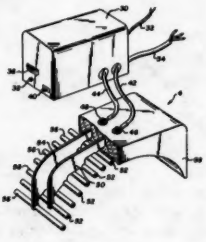


1. A microwave popcorn popper, comprising:
a generally cylindrical open topped container having a flat circular floor;
a domed cover removably received in sealing relation over said open topped container, a plurality of vent apertures provided in said cover;
a raised frusto conical partition having a radially outwardly and axially downwardly inclined upper surface in said container, above said circular floor;
an elongated cylindrical tube centrally disposed in said container, said tube received through a central circular aperture in said frusto conical partition with a bottom end of said tube resting on said flat circular floor;
an upwardly opening cone received in a bottom of said tube for holding a quantity of unpopped corn and popping oil;
a plurality of vent apertures spaced circumferentially around a top portion of said tube;
and
a circular cap over an open top end of said tube, said cap formed by two semi-circular plates connected by a central hinge.

4,873,407
DIELECTRIC CROSS MACHINE MOISTURE CONTROL

Douglas W. P. Smith, Port Coquitlam, Canada, assignor to Devron-Hercules, Inc., North Vancouver, Canada

Continuation of Ser. No. 946,421, Dec. 24, 1986, abandoned.
This application Feb. 17, 1989, Ser. No. 312,438
Int. Cl.[4] H05B *6/54*
U.S. Cl. 219—10.43 11 Claims

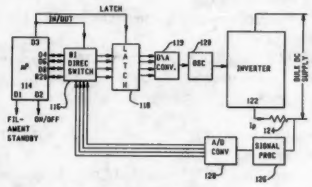


1. A method of applying heat to a paper web by subjecting the web to dielectric heating in discrete segments, comprising the steps of:
providing a plurality of discrete heating modules distributed transverse to the width of the web and all opposite one major surface of the web to control moisture in the web in the cross-machine direction;
providing in each of said heating modules a plurality of pairs of equally-spaced heating electrodes, with said heating electrodes extending over a respective one of said discrete segments in a spaced-apart array facing said surface of the web and with said heating electrodes being equally spaced from the web;
connecting one electrode of each of said pairs together to a first current supply conductor and the other electrode of each of said pairs together to a second current supply conductor; and
energizing said heating modules by supplying an electrical current through said conductors to effect dielectric heating of said web so that the web is heated by current flow between said electrodes in accordance with the moisture profile of said web.

4,873,408
MAGNETRON WITH MICROPROCESSOR BASED FEEDBACK CONTROL

Pamela S. Smith, Anchorage, Ky., and Peter H. Smith, deceased, late of Anchorage, Ky. (by Pamela S. Smith, executor), assignors to General Electric Company, Louisville, Ky.

Filed Dec. 28, 1987, Ser. No. 138,139
Int. Cl.[4] H05B *6/68*
U.S. Cl. 219—10.55 B 17 Claims



1. A microwave energy generating system comprising:
a magnetron operable to generate microwave energy for cooking;
a power transformer having a primary and a magnetron powering secondary;
an inverter having controlled switches and connected to supply power to said primary by selectively switching said controlled switches;
a control circuit for controlling operation of said inverter, said control circuit having an oscillator and operable to generate gating pulses to switch said controlled switches;
a first feedback loop having a current sensor and a comparing means, said current sensor providing a sensed signal dependent on a current within a part of the system, said comparing means comparing said sensed signal with a reference signal and generating a shutdown signal when the current sensed by the current sensor exceeds a value corresponding to said reference signal; said comparing means being connected to said control circuit such that the shutdown signal stops the control circuit from supplying gating pulses to said controlled switches; and
a second feedback loop including a microprocessor, and a magnetron power sensing means, said magnetron power

sensing means providing a signal to said microprocessor dependent upon magnetron power, said microprocessor being connected to said control circuit to adjust inverter operation to stabilize magnetron power at a desired level; and

wherein said first feedback loop has a relatively fast response time, and said second feedback loop has a relatively slow response time.

4,873,409

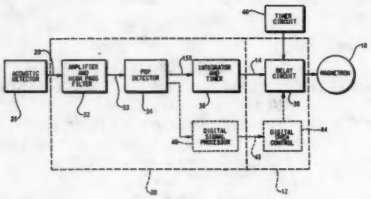
CLOSED-LOOP MICROWAVE POPCORN CONTROL

Fred T. Spruytenburg, 3321 Piedmont Cove, Memphis, Tenn. 38115; Charles McDonald, 4135 Cottonwood, Memphis, Tenn. 38118, and Michael J. Hodgetts, 7991 Elm Leaf Dr., Germantown, Tenn. 38138

Filed Oct. 26, 1987, Ser. No. 113,646

Int. Cl.[4] H05B *6/68*

U.S. Cl. 219—10.55 M **24 Claims**



1. A closed-loop automatic control for popping popcorn in a microwave oven comprising:

(a) sound transducer means acoustically coupled to a microwave oven cavity having

(i) an input for receiving sound generated by the popping of popcorn in the microwave oven cavity, and

(ii) an electrical output representative thereof;

(b) interface circuit means having

(i) an input connected to the electrical output of the sound transducer, and

(ii) an output providing a shut-off signal responsive to a decreasing level of popping rate of popcorn in the oven; and

(c) a microwave oven control circuit having:

(i) an input connected to the interface circuit output, and

(ii) an output connected to control a source of microwaves in response to a signal at the input

wherein the interface circuit means provides the shut-off signal to the oven control circuit when the rate of individual popping of the popcorn falls to an end rate corresponding to the effective completion of popping such that the oven control circuit and source of microwaves are thereafter deactivated.

4,873,410

PARALLEL GAP WELDER

Samuel S. Aidlin; Stephen H. Aidlin; Russell O. Bailey, all of Sarasota, and Ed Myers, Bradenton, all of Fla., assignors to Aidlin Automation Corp., Sarasota, Fla.

Filed Dec. 28, 1987, Ser. No. 138,352

Int. Cl.[4] B23K *11/16*

U.S. Cl. 219—56.1 **5 Claims**

1. A welder comprising:

a base means having a surface to support a workpiece in a predetermined position;

vertical support means extending from the rear end of the base means;

a first shaft means journaled for rotation in the vertical support mean;

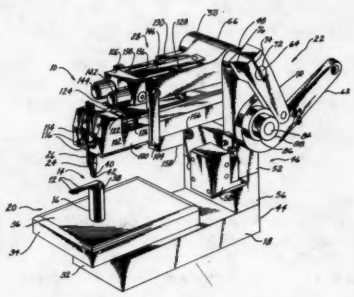
a first support means mounted on the first shaft means between the vertical support means for movement in an arcuate path of travel;

follower arm means secured to one end of the first shaft means;

second shaft means secured between the vertical support means;

handle means mounted for rotation on the second shaft means, the handle means being provided with rotatable cam means to rotate the follower arm means, first shaft means and first support means in response to movement of the handle means;

second support means secured at their rear ends to the second shaft means for movement in an arcuate path of travel;



electrode means secured to the front ends of the second support means for movement in an arcuate path of travel;

bracket arm means secured to the edges of the first support means to provide shoulders for supporting the second support means and limit their downward motion;

leaf spring means secured at their rear ends to the first support means;

finger means mounted for longitudinal movement with respect to the first support means with their lower edges adapted to contact predetermined portions of the leaf spring means for varying the tensions to be applied to the workpiece by the electrode means; and

electrical means responsive to motion of the handle means to energize the electrode means after they have contacted the workpiece.

4,873,411

METHOD OF SPOT-WELDING FLAT-TYPE ELECTRICAL WIRES TO METAL TERMINALS

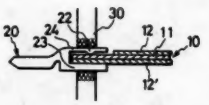
Haruo Saen, and Kougi Kobayashi, both of Tochigi, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Jan. 11, 1988, Ser. No. 141,749

Claims priority, application Japan, Jan. 9, 1987, 62-2861

Int. Cl.[4] B23K *11/14*

U.S. Cl. 219—93 **3 Claims**



1. In a method of spot welding a flat-type electrical conductor, consisting of at least one conductor sandwiched between insulators, to a metal terminal, consisting of first and second metal plates at least partially connected to each other, comprising the steps of:

removing the insulator from one side of the conductor at an

end portion of the flat-type electrical conductor to expose the conductor on said one side;

providing one of said first and second metal plates with a projection;

placing said first and second metal plates over said end portion of the flat-type electrical conductor such that the one of the first and second metal plates with the projection is disposed over said exposed conductor; and

contacting said projection with said exposed conductor before said conductor is spot-welded to said metal plates.

4,873,412

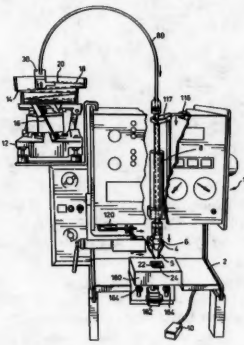
AUTOMATIC FEED APPARATUS, FOR FUSION WELDING MACHINE, AND ELECTRODE HOLDER THEREFOR

Peter S. Vinczer, 1 Parkington Crescent, Scarborough, Ontario, Canada (M1H 2T6), and Ferenc B. Vinczer, 2 Lynch Rd., Willowdale, Ontario, Canada M2J 2V5

Filed Dec. 18, 1986, Ser. No. 943,114

Int. Cl.[4] B23K *9/22*

U.S. Cl. 219—95 **20 Claims**



1. An automatic feed apparatus, for a fusion welding machine, the automatic feed apparatus comprising:

an electrode holder, adapted for mounting on a driver cylinder of a fusion welding machine for holding a pin for fusion welding to a base piece, the electrode holder including a clamping means for clamping a pin;

a holder control unit, which is mounted for opening the clamping means of the electrode holder;

a feeding device for feeding pins to the electrode holder; and

a feed control unit, which is connected to the feeding device and to the holder control unit, operation of the holder control unit and feed control unit being synchronized, so that the feed control unit only actuates the feeding device to feed a pin to the electrode holder when the holder control unit has opened the electrode holder, and after a predetermined time, the feed control unit terminates actuation of the feeding device and the holder control unit releases the clamping means, thereby clamping a pin.

4,873,413

METHOD AND APPARATUS FOR WRITING A LINE ON A PATTERNED SUBSTRATE

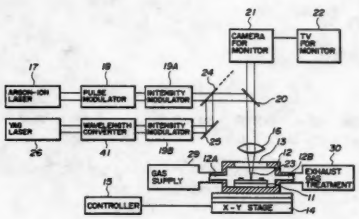
Fumihiko Uesugi, and Yukio Morishige, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Nov. 20, 1987, Ser. No. 123,460

Claims priority, application Japan, Nov. 20, 1986, 61-275234; Nov. 25, 1986, 61-280995

Int. Cl.[4] B23K *26/00*

U.S. Cl. 219—121.68 **5 Claims**



1. An apparatus for writing a line on a patterned substrate comprising,

a laser beam source for radiating a laser beam,

a CVD cell in which a substrate is positioned, said CVD cell having a window for passing said laser beam, said substrate having at least two kinds of patterned films thereon, each being of a thermal conductivity different from others,

an optical focusing means for focusing said laser beam to form a beam spot on the surface of said substrate,

a gas supply means for supplying a CVD raw material gas into said CVD cell,

an optical power control means selected from a pulse modulator, and intensity modulator, a wavelength converter, a beam shape converter, and a scanning speed controller, said optical power control means controlling optical power consumed in a laser beam spot-radiating area of said substrate dependent on the thermal conductivity of said laser beam spot-radiating area, thereby increasing the temperature of said laser beam spot-radiating area to a predetermined temperature regardless of the difference of said thermal conductivity, and

a stage means on which said CVD cell is provided to be moved in the scanning direction so that said substrate in said CVD cell is scanned by said beam spot.

4,873,414

LASER DRILLING OF COMPONENTS

Kong Ma, Duluth, and John T. Pinder, Marietta, both of Ga., assignors to Rolls Royce Inc., Greenwich, Conn.

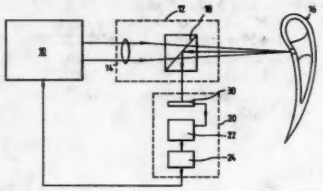
Filed Jun. 13, 1988, Ser. No. 206,125

Int. Cl.[4] B23K *26/00*

U.S. Cl. 219—121.7 **17 Claims**

1. A method of drilling through an outer wall of a hollow component in which a laser beam is directed at an outer surface of the outer wall and emerges from an inner surface of the

component, comprising the step of providing at the inner surface of the component, in the vicinity of where the beam



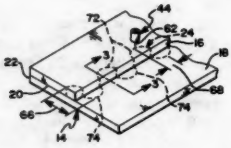
emerges, a thixotropic medium that comprises material for dispersing the laser light.

4,873,415

METHOD FOR WELDING GALVANIZED MATERIAL

Trevor A. Johnson, Orland Park, Ill., and Sharon L. Gorscak, Ann Arbor, Mich., assignors to Raycon Corporation, Ann Arbor, Mich.

Filed Feb. 2, 1988, Ser. No. 151,465
Int. Cl.[4] B23K *26/00*
U.S. Cl. 219—121.64 16 Claims



1. Method for welding galvanized steel comprising the steps of:

electroplating mild steel with a gum coating of zinc;

spraying the gum coated steel with a zinc rich coating having a thickness in the range of 0.001 to 0.3 millimeters;

providing a plurality of sheets with the aforesaid first and second coatings and with an edge on each of the sheets;

juxtaposing the plurality of sheets with one another to form a lapped joint at edges of at least two of said plurality of sheets; and

laser welding the juxtaposed sheets at the lapped joint along a pattern which will bond the juxtaposed sheets to one another while providing for the escape of vapor generated at the weld pool through a path at the lapped joint.

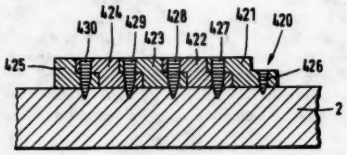
4,873,416

METHOD FOR THE APPLICATION AND FASTENING OF ROTATING BANDS ON PROJECTILE BODIES

Dieter Böder, Düsseldorf, Fed. Rep. of Germany, assignor to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany

Filed Sep. 28, 1987, Ser. No. 105,954
Int. Cl.[4] B23K *26/00*
U.S. Cl. 219—121.64 12 Claims

1. A method for the application of rotating bands on a projectile body comprising: winding at least one layer of a first ribbon-like material around the projectile body; fastening the ribbon-like material on the projectile body by applying a laser in a deep-penetration welding process; and giving the beam an



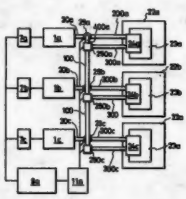
intensity so that only a small zone near the surface of the projectile body is melted to the ribbon-like material.

4,873,417

LASER MACHINING APPARATUS

Masaharu Moriyasu; Takeshi Morita, and Megumi Ohmine, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 24, 1987, Ser. No. 137,690
Claims priority, application Japan, Dec. 26, 1986, 61-308382; Dec. 26, 1986, 61-308384
Int. Cl.[4] B23K *26/00*
U.S. Cl. 219—121.6 9 Claims



1. A laser machining apparatus for machining a workpiece by irradiating the workpiece with laser beams generated by a plurality of laser oscillators, said plurality of laser oscillators including CO_2 laser, a single mode CO_2 pulse laser, and a continuously excited Q switch YAG pulse laser, said apparatus comprising;

a plurality of laser beam machining portions, each composed of one of said plurality of laser oscillators, a machining station and a first laser beam transmission path;

a plurality of second laser beam transmission paths connecting adjacent ones of said first laser beam transmission paths; and

a plurality of laser beam converters each provided in a junction between one of said first laser beam transmission paths and a respective one of said second laser beam transmission paths.

4,873,418

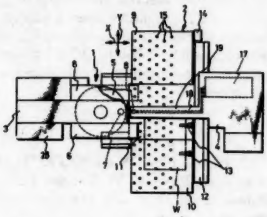
COMPOUND MACHINING APPARATUS

Isao Katayama, Kagamihara, Japan, assignor to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Continuation-in-part of Ser. No. 239,218, Aug. 31, 1988, Pat. No. 4,833,292. This application Feb. 16, 1989, Ser. No. 310,911
Claims priority, application Japan, Sep. 3, 1987, 62-134893
Int. Cl.[4] B23K *26/00*
U.S. Cl. 219—121.6 11 Claims

1. A compound machining apparatus comprising a punch press, a laser oscillator having a long side and a movable table device having a table movable in a first direction, characterized in that the punch press and the movable table device are

provided on separate frames, respectively, and the laser oscillator, a laser beam machining head and a guide tube for guiding a laser beam from the laser oscillator to the laser beam machining head are collectively placed on the same frame as the frame of said movable table device, wherein the long side of the laser oscillator is arranged substantially perpendicular to the first direction.



4,873,419

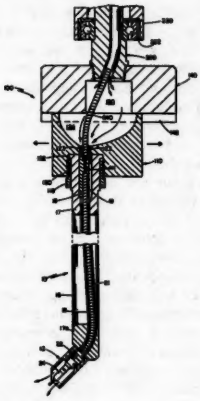
AUTOMATIC WELDING APPARATUS FOR WELD BUILD-UP AND METHOD OF ACHIEVING WELD BUILD-UP

Rees H. Acheson, Hill Rd., Alstead, N.H. 03602

Continuation-in-part of Ser. No. 759,543, Jul. 26, 1985, abandoned, which is a continuation-in-part of Ser. No. 707,341, Mar. 10, 1985, abandoned. This application Jan. 2, 1986, Ser. No. 815,682

Int. Cl.[4] B23K *11/30*

U.S. Cl. 219—125.1 **7 Claims**



1. Welding apparatus for weld build-up on a surface of revolution, comprising:

an elongated, rotatable assembly that supports, at one end, an electrical welding torch that terminates in a nozzle,

said rotatable assembly being adapted to introduce electrical welding current, inert gas, and welding wire to the torch, characterized in that

said assembly comprises an electrically conductive, hollow, metal drive spindle,

means are provided for both applying driving motion and conducting electrical current by said metal drive spindle for transmission to the torch, and

means are provided for passage of gas and welding wire through said current-carrying spindle to the torch,

said means for conducting electrical current to said drive spindle comprising a rotatable power connector comprising first and second metal housings and first and second current-conductive washers; said first housing being fixedly attached to said spindle, said second housing being provided with an electrical power conduit, said first washer being fixedly attached to said first housing, said second washer being fixedly attached to said second housing, and both said second washer and said second housing being slipped over a stem of said first housing; said housings and said washers providing said rotatable power connector with electrical power transmission means.

4,873,420

Patent Not Issued For This Number

4,873,421

LIQUID-FILLED ELECTRIC RADIATOR

Roland Brehmer, Fellingsbro, Sweden, and Adolfo Papi, Arras, France, assignors to AB Fellingsbro Verkstader, Sweden

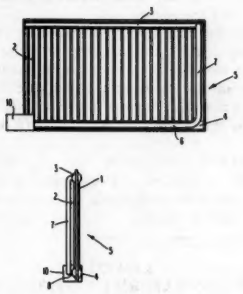
PCT No. PCT/SE86/00053, § 371 Date Oct. 27, 1986, § 102(e) Date Oct. 27, 1986, PCT Pub. No. WO86/04666, PCT Pub. Date Aug. 14, 1986

PCT Filed Feb. 7, 1986, Ser. No. 919,810

Claims priority, application Sweden, Feb. 8, 1985, 8500586

Int. Cl.[4] H05B *1/02*; F24H *3/10*

U.S. Cl. 219—341 **3 Claims**

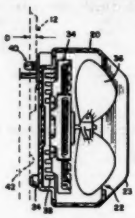


1. A liquid-filled electric radiator comprising a generally rectangular, vertically disposed radiator body having an upper horizontal distribution duct and a lower horizontal collection duct, said ducts being in liquid connection to each other through a plurality of connecting ducts within the radiator body and through a separate vessel in the form of an angularly bent pipe having a mainly uniform cross section and including a first section connected in series with a second section, said bent pipe having its free ends connected respectively to said upper and lower ducts at diagonally opposite positions on said radiator body, said first section of said pipe being arranged parallel to and in level with said lower collection duct and being connected at its free end to said lower duct via a short branch pipe, while said second section of said pipe is arranged parallel to and immediately adjacent the vertical side of the radiator body within the border line of the body and having its free end connected to the distribution duct, an electric immersion heating element housed in said first section for heating a liquid filling said ducts and said vessel, said first section having a hermetically sealed connection at its free end through which pass means for energizing the immersion heating element.

4,873,422
WALL MOUNTED HEATER WITH PLUG MOUNT AND SUPPORT

Herbert K. Streich, Scottsdale; Robert D. Leach, Phoenix; Joel R. Johnson, Peoria; Thomas B. Olson, Paradise Valley, and Donald L. Townsend, Chandler, all of Ariz., assignors to Arvin Industries, Inc., Columbus, Ind.

Filed May 5, 1988, Ser. No. 190,497
Int. Cl.[4] H05B *3/02*
U.S. Cl. 219—370 **24 Claims**



1. A heater assembly for heating a space contained at least in part by a wall, the heater assembly being adapted to be supported by an electrical receptical mounted in the wall, the heater assembly comprising,

heater means for generating heat when receiving electrical power,

cover means for supporting and enclosing the heater means,

means for forcing air into the cover means to be heated by the heater means and to be discharged out of the cover means to heat the space,

a plug that is mateable directly with the wall-mounted electrical receptacle to provide power to the heater means only when the plug is mated with the receptacle,

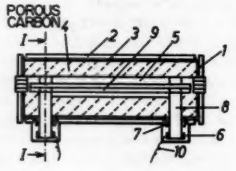
mounting means for mounting the plug directly in the cover means such that the plug acts to directly support the cover means only when the plug is mated with the receptacle, and

contact means situated below the plug and adapted to contact the wall below the receptacle so that the entire heater assembly is maintained in position solely by the plug and contact means.

4,873,423
HIGH TEMPERATURE HEATING FURNACE

Susumu Takahashi, Yokohama, Japan, assignor to Kanto Yakin Kogyo Kabushiki Kaisha, Japan

Filed Apr. 21, 1988, Ser. No. 184,224
Claims priority, application Japan, Aug. 21, 1987, 62-207912
Int. Cl.[4] H05B *3/62*
U.S. Cl. 219—390 **2 Claims**

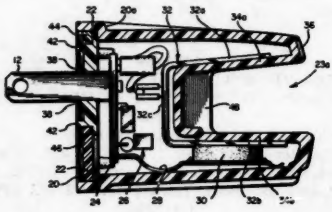


1. A high temperature heating furnace having therein carbon or graphite heating elements operative to heat the interior of said furnace to a temperature range of approximately 2000° C. to 3000° C., and which comprises a frame, a liner having therethrough a space extending longitudinally throughout a longitudinal distance of the furnace for passing therethrough articles to be treated by the furnace, said liner being formed within said frame by thermal insulation blocks having internal surfaces facing upon and defining said space, and being made from porous carbon having an electric resistivity in the range of approximately to 1 to 6 Ω.cm, and at least a pair of said carbon or graphite heating elements having an electric resistivity in the range or approximately 0.001 to 0.0007 Ω.cm, and being mounted to extend longitudinally of the furnace and along opposite sides, respectively, of said space.

4,873,424
WALL PLUG LENDS DISINFECTOR

Francis E. Ryder, Arab; Rowland W. Kanner, Guntersville, and Fred E. Williams, Arab, all of Ala., assignors to Ryder International Corporation, Arab, Ala.

Filed Jul. 19, 1988, Ser. No. 221,283
Int. Cl.[4] H05B *3/14*
U.S. Cl. 219—521 **25 Claims**



1. An appliance for electrically heated disinfection of contact lenses or similar objects, by direct electrical connection of the appliance to an electrical wall outlet, comprising:

(A) a housing having a pair of opposite side walls and a receiving cavity for insertion of a storage compartment containing a lens and disinfecting liquid;

(B) said housing including a floor wall below said cavity and a cover portion overlying said cavity for preventing vertical access to said storage compartment when said compartment is installed in said cavity;

(C) said housing further including a pair of horizontally aligned side openings through said respective opposite housing side walls, each of said openings being located and dimensioned to allow sliding passage of said storage compartment therethrough so that the storage compartment will fall by gravitation from said housing cavity through one of said side openings when said housing is rotated 90° to vertically align said side openings; and

(D) heating means for electrically generated heating of said storage compartment installed in said cavity, wherein said heating means comprises heat radiation means located above and separated from said cavity by a section of said cover portion, so that said radiation means generates downwardly directed radiant energy for heating said contact lens compartment without requiring heat conducting contact therewith.

4,873,425
VANDAL RESISTANT READ/WRITE DEVICE FOR ELECTRONIC MEMORY CARDS

Joel Langlais, Verrieres, and Maurice Paumard, Velizy, both of, assignors to Schlumberger Industries, Montrouge, France

Filed Apr. 6, 1988, Ser. No. 178,164
Claims priority, application France, Apr. 9, 1987, 87 04992; Oct. 22, 1987, 87 14601
Int. Cl.[4] G06K *13/00*
U.S. Cl. 235—441 **17 Claims**

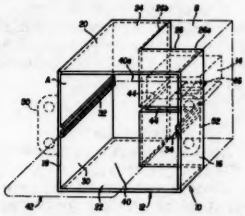
1. A read/write device for electronic memory cards com-

prising a card body with electrical contact tabs disposed in one of the main faces of said card body, said device comprising:

a housing provided with a front opening for enabling said card to be inserted into said housing;

a read/write head including electrical connection components disposed inside said housing;

guidance means for guiding said card between said front opening and a processing position in which said contact



tabs are suitably placed for coming into contact with said connection components of said read/write head; and

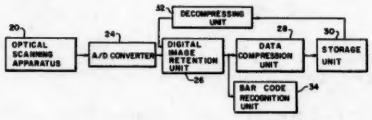
means for maintaining the portion of said card body including said contact tabs in position while said card is in the processing position, whereby said contact tabs are applied against said connection components of the read/write head; at least that region of the housing in which said read/write head is disposed being unobstructed at least at the bottom thereof.

4,873,426

TECHNIQUE FOR READING BAR CODES

David E. Y. Sarna, Teaneck, N.J., and Daniel Mailick, New Rochelle, N.Y., assignors to Image Business Systems Corporation, New York, N.Y.

Filed Aug. 3, 1988, Ser. No. 227,826
Int. Cl.[4] G06K 7/10
U.S. Cl. 235—462 **52 Claims**



1. A bar code apparatus for processing digitized bar code data stored electronically in bit map form and representative of a bar code having parallel bar code components including alternating dark bars and blank spaces carried on a light reflective surface, said bar code data being obtained by scanning said surface in lines along a primary scanning direction substantially perpendicular to the bar code components and at a resolution of a predetermined number of pixels per unit length to generate for a line of said pixels respective bar code signals having values related to the amount of light reflected by said dark bars and blank spaces, respectively, and scanning in a secondary scanning direction substantially perpendicular to said primary scanning direction to traverse a plurality of said scanning lines at a resolution of a predetermined number of lines per unit length, said bit map being produced from said bar code signals and having a plurality of bits arranged in rows, said rows corresponding, respectively, to the scanning lines, and the bits in each row corresponding to the pixels in a corresponding one of said scanning lines, the bit map bits having a bit value related to the bar code signal value of the corresponding pixels; said apparatus comprising:

memory means for storing assigned bar code component data related to a number of bits allotted, respectively, in a row of said bit map to said bar code components;

means for comparing the bit map with the stored bar code component data to identify said bar code components in said bit map; and

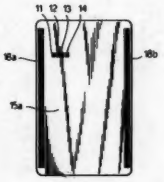
conversion means for providing from said identified bar code components a bar code reading result for converting the bar code to the message it represents.

4,873,427

CARD OR PASS IN PLASTIC MATERIAL INCORPORATING AN INTEGRATED MEMORY CIRCUIT

Antonio Virdia, Trento, Italy, assignor to Pentasystem S.p.A., Trento, Italy

PCT No. PCT/IT86/00050, § 371 Date Jul. 30, 1987, § 102(e) Date Jul. 30, 1987, PCT Pub. No. WO87/02807, PCT Pub. Date May 7, 1987
PCT Filed Jul. 8, 1986, Ser. No. 76,931
Claims priority, application Italy, Oct. 23, 1985, 22594 A/85
Int. Cl.[4] G06K 19/06
U.S. Cl. 235—492 **7 Claims**



1. An identification system, comprising

(a) a card formed of synthetic plastic material which is transparent to infrared rays;

(b) an integrated memory circuit arranged within said card and comprising a plurality of memory cells and voltage conversion circuits for generating the voltages necessary for programming said cells;

(c) an optical code univocally associated with and arranged within said card, said code further being associated with data contained in said memory circuit and being used as a component of an access key for the information stored in said memory circuit via an external reading/writing device; and

(d) four contacts arranged on said card and connected with said memory circuit and including a first contact (VCC) receiving a feed signal, a second contact (VSS) being connected with a feed return line, a third contact (SCL) transmitting a logic signal acting as a clock signal for data and instructions, and a fourth contact (SDA) connected with an open drain two-dimensional line and acting as a support for data and instructions,

(e) the voltage applied to said third and fourth contacts being variable between low and high logic levels;

(f) said external reading/writing device providing the clock signal for transferring data from and to said memory circuit;

(g) the line connected with said fourth contact changing its status only when said third contact is low with said fourth contact status variations occurring when said third contact is high and being used to indicate START and STOP conditions for a transmission;

(h) all controls being preceded by the START condition with no data byte following it and subsequently the selection control is sent with RW=1 and, continuing to generate the clock signal, the desired byte is received from the memory, whereby if the generation of the clock signal continues, the memory continues to send new bytes, increasing the memory addres from which they are drawn and if the memory address exceeds the limit of the 256 bytes page, said address is put to zero so that the bits

selected subsequently are taken commencing from the beginning of the same page.

4,873,428

IMAGE PROCESSING APPARATUS USING CONVERSION MEANS

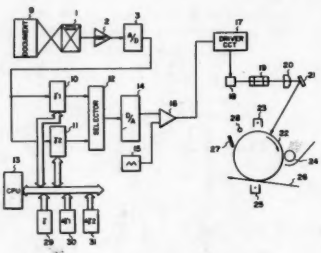
Akihiko Takeuchi, and Yoji Tomoyuki, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 162,303, Feb. 29, 1988, abandoned. This application Mar. 20, 1989, Ser. No. 325,022

Claims priority, application Japan, Mar. 3, 1987, 62-046780; Mar. 3, 1987, 62-046781; Jun. 30, 1987, 62-164818

Int. Cl.[4] H04N *1/10*

U.S. Cl. 250—214 DC **26 Claims**



1. An image processing apparatus comprising:

image data generation means;

characteristic conversion means for converting a characteristic of image data generated by said image data generation means;

said characteristic conversion means including a first conversion table for converting the characteristic of the image data in a first mode, and a second conversion table for converting the characteristic of the image data in a second mode different from the first mode;

said first and second conversion tables being selectively used in recording one image; and

data formation means for forming data to be stored in said first and second conversion tables;

said data formation means having a reference characteristic conversion table to be used as a base in forming the data.

4,873,429

OPTICAL PICK-UP HEAD WITHOUT PICK-UP OF STRAY LIGHT

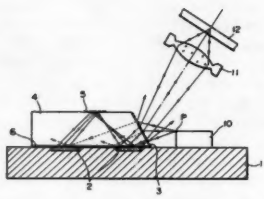
Hidehiro Kume; Yoshiyuki Matsumoto, and You Yoshitoshi, all of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Feb. 3, 1988, Ser. No. 152,007

Claims priority, application Japan, Feb. 6, 1987, 62-25936

Int. Cl.[4] H01J *3/14*

U.S. Cl. 250—216 **5 Claims**



1. An optical pick-up head which reads information recorded on a record medium by irradiating said record medium with light generated from a laser source and receiving return light therefrom by a light sensor, comprising, in combination:

a substrate on which the optical sensor is formed;

an optical member adhered by adhesive on said optical sensor on said substrate, said adhesive having a refractive index different from that of said optical member; and

a semi-transmissive reflective film adapted to reflect light emitted directly from said laser source and to transmit light returned from said record medium,

characterized in that light is prevented from directly reaching the optical sensor from the laser source by differentiating the refractive index of said optical member from the refractive index of said adhesive.

4,873,430

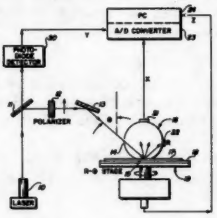
METHOD AND APPARATUS FOR OPTICALLY MEASURING CHARACTERISTICS OF A THIN FILM BY DIRECTING A P-POLARIZED BEAM THROUGH AN INTEGRATING SPHERE AT THE BREWSTER'S ANGLE OF THE FILM

Anthony Juliana; Wai C. Leung, both of San Jose; Victor T. Pan, Fremont; Hal J. Rosen, Los Gatos, and Timothy C. Strand, San Jose, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 25, 1988, Ser. No. 262,558

Int. Cl.[4] G01V *5/00*

U.S. Cl. 250—225 **15 Claims**



1. A method of optically measuring at least one characteristic of a thin film on a reflecting substrate, comprising the steps of:

directing a p-polarized beam of collimated light of known intensity through one aperture in an integrating sphere and via a second aperture therein onto the film at substantially the Brewster's angle of the film;

reflecting all the light into the sphere, including (i) all diffusely reflected light and (ii) the light specularly reflected at a region inside the sphere where the specularly reflected light is incident; and

sensing the light intensity within the sphere for measuring said at least one characteristic of the film.

4,873,431

RECORDING APPARATUS WITH OPTICAL FIBER CABLE INTERCONNECTING MICROCOMPUTERS

Masazumi Ito, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Aug. 11, 1988, Ser. No. 231,095

Claims priority, application Japan, Aug. 12, 1987, 62-202195; Aug. 17, 1987, 62-204474; Sep. 16, 1987, 62-233233

Int. Cl.[4] H01J *5/16*

U.S. Cl. 250—227 **11 Claims**

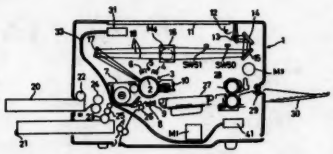
9. A control system for controlling a recording apparatus comprising:

a reset circuit for generating a reset signal;

a light-emitting circuit having a light-emitting device connected to a signal output terminal of said reset circuit; and

optical fiber cable means interconnecting between said light-emitting device and a plurality of microcomputers; each of said microcomputers including,

interface means having an electric interface and an optical interface formed integrally with said electric interface, said optical interface including a light-receiving device and adapted for interfacing the reset signal,



an optical fiber cable connector attached to the package of said microcomputer, and

an internal light transmission line for connecting said optical fiber cable connector to said optical interface inside said microcomputer package.

4,873,432

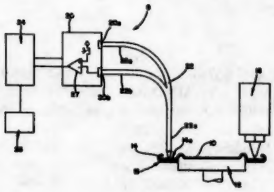
COMPOUND APPLICATION DETECTOR

George W. Alderman, Barrington, Ill., assignor to American National Can Company, Chicago, Ill.

Filed Aug. 25, 1988, Ser. No. 236,640

Int. Cl.[4] H01J *5/16*; B65B *7/00*

U.S. Cl. 250—227 **13 Claims**



1. A detector for a can making apparatus applying a compound to a seaming flange of a can end, the detector for detecting the presence of said compound on said seaming flange of said can end comprising:

means for generating an infrared signal;

means for receiving an infrared signal;

a first fiber optic cable having a first end coupled to said infrared signal generating means and a second end directed toward said seaming flange of said can end, said first fiber optic cable for transmitting said generated infrared signal toward said seaming flange of said can end, causing said seaming flange to reflect a portion of said generated signal as a reflected signal, wherein said seaming flange reflects a first proportion of said generated infrared light in the absence of said compound and a second proportion of said generated infrared light in the presence of said compound;

a second fiber optic cable having a first end directed toward said seaming flange of said can end and a second end coupled to said infrared signal receiving means, said second fiber optic cable for transmitting said reflected infrared signal from said seaming flange to said infrared signal receiving means;

means for comparing said reflected infrared signal received by said infrared signal receiving means to a reference value representing a desired thickness of said compound applied to said seaming flange; and

means for generating a reject signal in the event that said comparing means indicates that less than said desired thickness of said compound has been applied.

4,873,433

ELECTROMAGNETIC RADIATION DETECTING DEVICE WITH HOLLOW SEMICYLINDRICAL CHOPPER

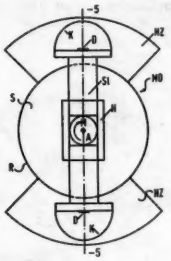
Dieter Lorenz, Hohenpeissenberg, Fed. Rep. of Germany, assignor to Deutsche Forschungs - und Versuchsanstalt fur Luft - und Raumfahrt e.V., Fed. Rep. of Germany

Filed Mar. 9, 1988, Ser. No. 165,837

Claims priority, application Fed. Rep. of Germany, Mar. 12, 1987, 3708043

Int. Cl.[4] G01D *5/36*

U.S. Cl. 250—233 **8 Claims**



1. An electromagnetic radiation detecting device comprising at least one radiation detector for detection of electromagnetic radiation from a hemisphere corresponding to a solid angle 2π, the or each said detector including a receiving area for exposure to radiation from the respective hemisphere, a respective radiation-transparent hood covering the or each said detector, and a rotating chopper to alternately shield the or each said detector and associated hood from and to expose the or each said detector and associated hood to arriving electro-magnetic radiation, the chopper comprising a carrier member rotatable around an axis parallel to said receiving area of the or each said detector and at least one hollow semicylindrical shielding member which is carried by said carrier member and which is curved in the axial direction of the hollow semicylindrical shape, the or each said shielding member being movable on a circular path by said carrier member to alternately shield and reveal said respective hood covering the or each said detector.

4,873,434

SCANNING OPTICAL MICROSCOPE USING SINGLE LASER BEAM

Chung W. See, London, England, and Mehdi Vaez-Iravani, Peekskill, N.Y., assignors to National Research Development Corporation, London, United Kingdom

Filed Jul. 20, 1987, Ser. No. 75,508

Claims priority, application United Kingdom, Jul. 18, 1987, 8617570

Int. Cl.[4] G02F *1/11*

U.S. Cl. 250—235 **9 Claims**

1. A scanning optical microscope comprising:

a source of optical radiation;

means for focussing a single beam of radiation from said source into an interrogating spot on a surface under examination;

means for scanning said interrogating spot across said surface;

deflecting means for providing an oscillatory deflection of said interrogating spot so as to move said interrogating

spot sinusoidally across said surface as said interrogating spot is scanned across said surface; and

means for measuring the amplitude variation of the radiation reflected from said surface upon impingement of radiation at said oscillatory deflected scanning interrogating spot.

4,873,435

LASER BEAM SCANNING SYSTEM

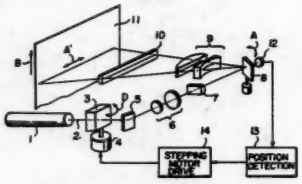
Shuji Ono, and Masafumi Yamamoto, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 27, 1988, Ser. No. 148,831

Claims priority, application Japan, Jan. 27, 1987, 62-17044

Int. Cl.[4] H04N *1/04*

U.S. Cl. 250—235 **2 Claims**



2. A laser beam scanning system comprising a laser source for emanating a laser beam, a light deflector for deflecting the laser beam emanating from the laser source to cause the laser beam to scan a surface-to-be-scanned, a beam position detecting means which detects the incident position of the laser beam on the light deflector, an optical path changing means which changes the optical path of the laser beam upstream of the light deflector, and a control circuit which drives the optical path changing means according to the output of the beam position detecting means so that the laser beam impinges upon the light deflector at a predetermined position, wherein said light deflector comprises a galvanometer mirror formed of a half-silvered mirror and said beam position detecting means is disposed on the optical path of the light beam passing through the galvanometer mirror.

4,873,436

NONDESTRUCTIVE READOUT OF A LATENT ELECTROSTATIC IMAGE FORMED ON AN INSULATING MATERIAL

Emil Kamieniecki; Leszek Reiss, both of Lexington, and William C. Goldfarb, Melrose, all of Mass., assignors to Optical Diagnostic Systems, Inc., Billerica, Mass.

Continuation-in-part of Ser. No. 719,725, Apr. 3, 1985, Pat. No. 4,663,526, which is a continuation-in-part of Ser. No. 686,420, Dec. 26, 1984, abandoned. This application May 4, 1987, Ser. No. 46,562

The portion of the term of this patent subsequent to May 5, 2004, has been disclaimed.

Int. Cl.[4] G01T *1/24*; H01L *31/00*

U.S. Cl. 250—315.3 **13 Claims**

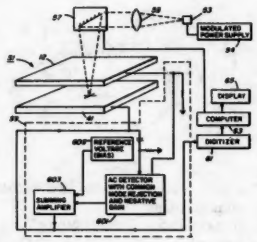
1. A photoreceptor for use in recording and reading out a charge distribution pattern comprising:

a. a reference electrode,

b. a photoconductive insulator, and

c. a semiconductor/pickup electrode combination, and

d. wherein either said reference electrode or said semiconductor pickup electrode combination or both of said reference electrode and said semiconductor/pickup electrode are segmented.



4,873,437

RADIATION IMAGE READ-OUT METHOD AND APPARATUS

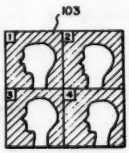
Nobuyoshi Nakajima, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 4, 1986, Ser. No. 903,802

Claims priority, application Japan, Sep. 4, 1985, 60-195455

Int. Cl.[4] H04N *5/30*; G01N *23/04*

U.S. Cl. 250—327.2 **8 Claims**



1. A radiation image read-out method in which a stimulable phosphor sheet carrying a radiation image of an object stored thereon is exposed to stimulating rays, light emitted by the stimulable phosphor sheet in proportion to the stored radiation energy when the stimulable phosphor sheet is exposed to the stimulating rays is photoelectrically detected by a light detection means to obtain an image signal for use in reproduction of a visible image, image processing condiiions are adjusted on the basis of image input information detected from the stimulable phosphor sheet, and an image processing is conducted on the image signal by use of the image processing conditions,

wherein the improvement comprises the steps of:

(i) in the case where said radiation image is read out from the stimulable phosphor sheet subjected to subdivision image recording conducted by exposing a plurality of subdivisions on said stimulable phosphor sheet respectively to a radiation in the radiation image recording

step, discriminating the respective regions of said plurality of subdivisions on the basis of information on said subdivision image recording,

(ii) determining said image processing conditions for the respective discriminated regions, and

(iii) adjusting said image processing conditions for the respective regions when said image processing is conducted.

4,873,438

RADIATION IMAGE READ-OUT APPARATUS USING A FLUORESCENT LIGHT GUIDE

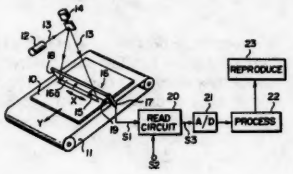
Yuichi Hosoi, and Kenji Takahashi, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 19, 1988, Ser. No. 144,982

Claims priority, application Japan, Jan. 16, 1987, 62-8570

Int. Cl.[4] G03B *42/08*; G01N *23/04*; G01T *1/105*

U.S. Cl. 250—327.2 **5 Claims**



5. A radiation image read-out apparatus comprising:

(i) a stimulating ray source for producing stimulating rays which excite stimulable phosphor,

(ii) a stimulating-ray main scanning means for scanning said stimulating rays on a stimulable phosphor sheet carrying a radiation image stores thereon,

(iii) a flourescent light guide member comprising a sheet-shaped material having a length, a width and a thickness which is small relative to said width, and said width being small relative to said length, a main surface of said material being defined by said length and width, and an end surface of said material being defined by said width and thickness, said material containing a phosphor and being disposed in such a direction that said main surface receives the light emitted by said stimulable phosphor sheet when said stimulable phosphor sheet is scanned by said stimulating rays,

(iv) a photodetector closely contacted with said end surface, and

(v) a sub-scanning means for moving said stimulable phosphor sheet with respect to said stimulating rays in a direction approximately normal to the direction of said scanning.

4,873,439

X-RAY DETECTOR

Peter L. Hagelstein, Acton, and Cristopher C. Eugster, Cambridge, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Jun. 27, 1988, Ser. No. 211,776

Int. Cl.[4] G01T *1/00*

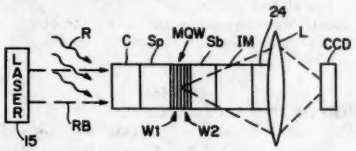
U.S. Cl. 250—327.2 **15 Claims**

1. Apparatus for detecting x-ray photons comprising:

(a) a first means responsive to said photons for generating carriers in response to said photons;

(b) a second means responsive to said generated carriers and having an index of refraction which changes in relation to the number of such carriers incident on said second means;

(c) a light beam incident on said second means, said beam being modulated by said changes; and



(d) imaging means responsive to said light means for displaying the modulations of said light beam.

4,873,440

ELECTRON MICROSCOPE IMAGE OUTPUT METHOD AND APPARATUS

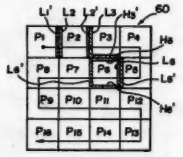
Nobufumi Mori; Takayuki Katoh, both of Kanagawa; Tetsuo Oikawa; Yoshiyasu Harada, both of Tokyo, and Junji Miyahara, Kanagawa, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa and Jeol Ltd., Tokyo, both of, Japan

Filed Dec. 24, 1987, Ser. No. 137,691

Claims priority, application Japan, Dec. 26, 1986, 61-311125

Int. Cl.[4] G03B *42/00*

U.S. Cl. 250—327.2 **2 Claims**



1. An apparatus for outputting an electron microscope image, which comprises:

(i) two-dimensional sensor for storing an electron beam image of a specimen formed by distribution of electron beam energy, said two-dimensional sensor being in the same vacuum system as an image formation plane of said electron microscope,

(ii) a stimulation means for exposing said two-dimensional sensor to light or heat,

(iii) a detection means for photoelectrically detecting light emitted by said two-dimensional upon exposure to light or heating, thereby to obtain image signals, and

(iv) a signal correction means for correcting the image signals detected at a plurality of divisions into which said specimen has been divided and storage of the electron beam image carried out for each of said divisions, so that signal values of the boundary areas of adjacent divisions become approximately equal to each other,

wherein said signal correction means comprises:

a first memory means for storing image signals of said plurality of divisions;

density data calculating means for calculating mean values for picture element strings at the boundaries between adjacent divisions of said plurality of divisions read from said first memory means and calculating correction coefficient values from said mean values;

density data memory means for storing said correction coefficient values;

density matching data processing means receiving said correction coefficient values for uniformly correcting said image signals of said plurality of divisions;

control means for selectively supplying said correction

coefficient values to said density matching data processing means when one of said image signals of one of said plurality of divisions is to be uniformly corrected; and

second memory means for storing the output of said density matching data processing means.

4,873,441

METHOD OF AND APPARATUS FOR RECORDING AND READING OUT RADIATION IMAGE INFORMATION

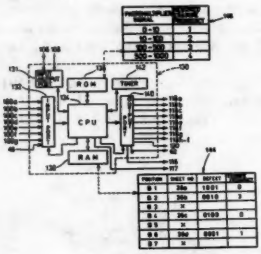
Tsutomu Kimura, and Yukio Watanabe, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Division of Ser. No. 793,009, Oct. 30, 1985. This application Sep. 30, 1987, Ser. No. 102,999

Claims priority, application Japan, Oct. 30, 1984, 59-228747; Oct. 30, 1984, 59-228748; Oct. 30, 1984, 59-228749

Int. Cl.[4] G01N *23/04*

U.S. Cl. 250—327.2 **8 Claims**



1. A method of recording and reading out radiation image information, comprising the steps of:

feeding stimulable phosphor sheets each capable of recording radiation image information along a predetermined circulatory feed path;

exposing said stimulable phosphor sheets to a radiation through an object to record the radiation image information of the object on the stimulable phosphor sheets in an image recording unit in said circulatory feed path;

reading out said radiation image information from said stimulable phosphor sheets in an image readout unit in said circulatory feed path;

erasing any remaining image from said stimulable phosphor sheets in an image erase unit in said circulatory feed path; and

exposing said stimulable phosphor sheets to stimulating light to detect any defect thereon before radiation image information is successively recorded on said stimulable phosphor sheets, and feeding those stimulable phosphor sheets which bear defects through said circulatory feed path while skipping said image recording, reading, and erasing steps.

4,873,442

METHOD AND APPARATUS FOR SCANNING THERMAL IMAGES

Robert W. Klait, Rancho Palos Verdes, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 9, 1985, Ser. No. 806,895

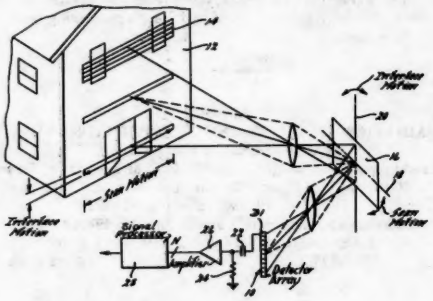
Int. Cl.[4] H01J *31/50*

U.S. Cl. 250—334 **20 Claims**

1. An imaging sensor for scanning an image in an object space during first and second portions of a scanning cycle, said imaging sensor comprising:;

a plurality of infrared detector channels each comprising an infrared detector, each of said infrared detectors having an overlapping field-of-view with another of said infrared detectors; and

means for reflecting said object space onto said infrared detectors, said means for reflecting said object space onto said infrared detectors operable to expose each of said



infrared detectors to the field-of-view of at least one other of said infrared detectors to allow said infrared detectors to be calibrated by sequentially comparing the outputs of each of said elemental detectors with another of said elemental detectors having an overlapping fields-of-view.

4,873,443

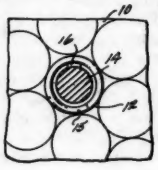
MAGNETIC SUPERCONDUCTING DETECTOR

Richard T. Schneider, Alachua, Fla., assignor to Progress Technology Corporation, St. Petersburg, Fla.

Filed Dec. 23, 1987, Ser. No. 137,136

Int. Cl.[4] H01L *39/00, 27/18*

U.S. Cl. 250—336.2 **24 Claims**



1. A photon detector comprising:

a superconducting material;

means for maintaining said superconducting material in a superconducting state; and

means for sensing induced currents formed in said material when said photons strike said material.

4,873,444

DETECTION OF SURFACE IMPURITY PHASES IN HIGH T_C SUPERCONDUCTORS USING THERMALLY STIMULATED LUMINESCENCE

D. Wayne Cooke, Los Alamos, N. Mex., and Muhammad S. Jahan, Bartlett, Tenn., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Nov. 23, 1988, Ser. No. 276,188

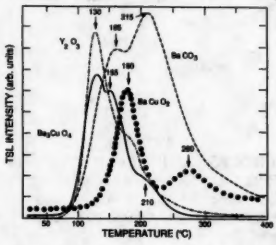
Int. Cl.[4] G01N *23/00*

U.S. Cl. 250—337 **11 Claims**

1. A method for detecting insulating phases in samples of superconducting materials which comprises the steps of:

irradiating the sample with ionizing radiation in order to induce charge trapping in the insulating phases;

heating the irradiated sample to yield luminescence; and



detecting the luminescence as a function of sample temperature.

4,873,445

SOURCE OF IONS OF THE TRIODE TYPE WITH A SINGLE HIGH FREQUENCY EXITATION IONIZATION CHAMBER AND MAGNETIC CONFINEMENT OF THE MULTIPOLE TYPE

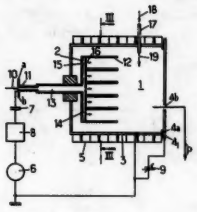
Claude Le Jeung, Gif Sur Yvette, France, assignor to Centre National de la Recherche Scientifique, Paris, France

Continuation of Ser. No. 97,268, Sep. 17, 1987, abandoned, which is a continuation-in-part of Ser. No. 856,412, Apr. 28, 1986, abandoned. This application Nov. 15, 1988, Ser. No. 273,179

Claims priority, application France, Apr. 29, 1985, 85 06492

Int. Cl.[4] H01J *27/00*

U.S. Cl. 250—432 R **18 Claims**



1. A discharge ion source with a single ionization chamber, comprising in combination with a single ionization chamber: an amagnetic cathode forming a capacitor plate and cooled by a flow of fluid, which cathode is disposed inside the ionization chamber in the vicinity of a first end thereof; an amagnetic anode forming at least a part of a wall of the ionization chamber; means for applying between the cathode and the anode a high frequency AC voltage, said frequency being at least equal to the value of the lower limit frequency from which the plasma of the chamber is permanently ignited in a state of stationary equilibrium independent of time; a third electrode disposed at a second end of the chamber opposite a first end; means for biasing the third electrode independently with respect to an assembly of the cathode and the anode; a system of alternate magnetic poles for creating a multi-mirror magnetic configuration about the anode; means for injecting at least one gas to be ionized into the ionization chamber; at least one orifice for discharging gases from the ionization chamber; and pumping means controlled for exhausting gases from the ionization chamber through said at least one orifice.

4,873,446

DEVICE FOR IRRADIATING DENTURE PARTS

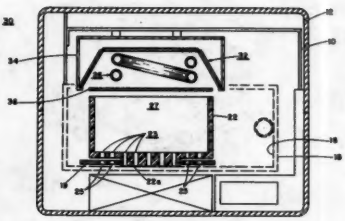
Albert Kreitmair, Forstenrieder Allee 233b, 8000 Müchen 71, and Günther Nath, Delpstrasse 27, 8000 München 80, both of Fed. Rep. of Germany

Continuation of Ser. No. 9,613, Jan. 22, 1987, which is a continuation of Ser. No. 487,577, Apr. 22, 1983. This application Jul. 6, 1988, Ser. No. 218,472

Claims priority, application Fed. Rep. of Germany, Apr. 27, 1982, 3215664; Aug. 4, 1982, 3229117; Sep. 15, 1982, 8226016; Oct. 4, 1982, 8227782

Int. Cl.[4] C08J *7/18*

U.S. Cl. 250—492.1 **13 Claims**



1. Irradiation device for treating a synthetic material in denture parts, said device comprising an electric lamp for emitting useful radiation in a short-wave visible and near ultraviolet spectral ranges and undesired IR radiation; a receptacle defining a cup shaped irradiation chamber for a denture part to be irradiated; said chamber having a radiation entrance opening facing said lamp; and a concave reflector associated with said lamp to reflect the useful radiation from th elamp toward the radiation entrance opening of said irradiation chamber and to allow passage of the undesired radiation out of said irradiation device, wherein said concave reflector has essentially the shape of a truncated pyramid for reflecting the useful radiation of said lamp, and wherein said electric lamp is a xenon flash-lamp, which has a curved bulb extending in two dimensions in a plan view of said radiation entrance opening of said irradiation chamber, said two dimensions being normal to a vertical axis of said irradiation chamber, said concave reflector being comprised of flat thin-film dielectric interference filter panes, said irradiation chamber being defined by walls, at least at the inner surface thereof, made of a material selected from the group comprising PTFE and ceramic and including a support surface for accomodating denture parts of various sizes, and a flat pane thin-film interference filter provided between said lamp and said irradiation chamber, said filter provided between said lamp and said irradiation chamber transmitting useful radiation of shorter wavelength while reflecting said undesirable IR radiation of longer wavelength.

4,873,447

WAFER TRANSPORT APPARATUS FOR ION IMPLANTATION APPARATUS

Issei Imahashi, Tokyo, Japan, assignor to Tokyo Electron Limited, Tokyo, Japan

Continuation of Ser. No. 848,567, Apr. 7, 1986, abandoned. This application Jan. 15, 1988, Ser. No. 145,689

Int. Cl.[4] H01J *27/00*

U.S. Cl. 250—492.2 **13 Claims**

1. An ion implantation apparatus, comprising:

a vacuum processing chamber in which a wafer is subjected to ion implantation processing;

first and second auxiliary vacuum chambers each of which is hermetically sealable from or connectable to the outer atmosphere and vacuum processing chamber, and each of which is constructed to temporarily store the water;

first wafer transfer means for transferring a wafer into the

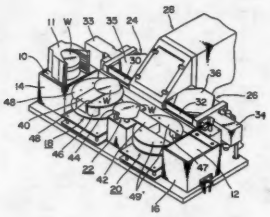
vacuum processing chamber from the first auxiliary vacuum chamber;

second wafer transfer means for transferring the wafer to the second auxiliary vacuum chamber from the vacuum processing chamber;

driving means for driving the first and second wafer transfer means in a mutually synchronized manner;

wafer cassette supporting means for supporting a cassette containing a plurality of wafers; and

wafer transport means for transporting the wafer into the first auxiliary vacuum chamber from the cassette one by one;



said driving means being connected to the first and second wafer transfer means to move them at the same time so that two wafers are simultaneously transferred to the vacuum processing chamber and second auxiliary vacuum chamber from the first auxiliary vacuum chamber and vacuum processing chamber;

wherein said first wafer transfer means includes first and second arms, said second wafer transfer means includes third and fourth arms, and said driving means includes a first retaining member connecting the first and third arms together, and a second retaining member connecting the second and fourth arms together.

4,873,448

INPUT CIRCUIT HAVING A PHOTO-COUPLER WITH BI-DIRECTIONAL INDICATOR

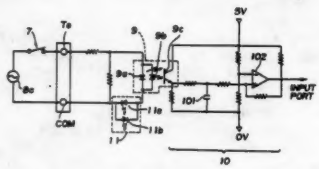
Hironobu Shirai, Takatsuki, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Apr. 27, 1987, Ser. No. 42,736

Claims priority, application Japan, Apr. 30, 1986, 61-65266

Int. Cl.[4] G02B *27/00*

U.S. Cl. 250—551 **10 Claims**



1. An output circuit for accepting an external input signal by way of a photo-coupler for circuit isolation, comprising:

a photo-coupler having an input end comprising a bi-directional element; and

an indicator of a bi-directional type which is connected in series with the input end of the photo-coupler and comprises a pair of light emitting diode chips.

4,873,449

PROCESS AND APPARATUS FOR THREE-DIMENSIONAL SURVEYING

Michel Paramythioti, 19 Bis, 7eme Avenue Le Lys, 60260 Lamorlaye, and Auguste d'Aligny, 197, rue du Temple, 75003 Paris, both of France

Filed Feb. 4, 1988, Ser. No. 152,137

Claims priority, application France, Feb. 4, 1987, 87 01360

Int. Cl.[4] G02B *27/42*

U.S. Cl. 250—560 **12 Claims**

1. A process of three-dimensional surveying in which a scene is scanned by emitting a laser beam in its direction, the image of the laser spot obtained in this way being formed on at least one element of an array of photoresistive receptor elements, the direction of the laser spot relative to the said array being determined from the position of the exited receptor element in said array of elements, and the three spatial coordinates of each point of scanning being calculated by triangulation on the basis of the angular orientation of the beam emitted and the said direction of the reflected spot received, characterized by the fact that

(a) the scene is scanned by controllably orienting the beam relatively roughly,

(b) the orientation of the beam emitted being measured more precisely independently of the controllable orientation thereof, and

(c) that the said spatial coordinates are calculated on the basis of the independently measured orientation of the beam emitted and the said direction of the spot.

4,873,450

ELECTRICAL GENERATING APPARATUS AND METHOD

James Quaintance, 303 Charlotte Dr., Port Lavaca, Tex. 77979

Continuation of Ser. No. 637,483, Aug. 3, 1984, abandoned. This application Aug. 28, 1985, Ser. No. 770,253

Int. Cl.[4] F03B *1/02*

U.S. Cl. 290—52 **7 Claims**

1. An electrical generating apparatus in a working environment of a tank comprising:

an electrical generating device housed in a container called the gavity-motor which is totally submerged below the surface of the working fluid such as a liquid contained in a tank with a pressurized gaseous atmosphere gravity accelerating fluid chamber called the passage;

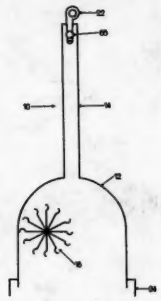
an anchored, water-tight rotor chamber which contains a rotor axle, rotor, and generator;

a submersible centrifugal pump located in the uppermost part of the passage whose discharge is directed vertically downward onto rotor vanes;

a valve connected to the discharge side of the pump;

an external electrical power source to supply the submersible centrifugal pump, air compressor, and generator;

and an opening in the bottom of the gravity-motor to permit transmission of working fluid flowing through the gravi-



ty-motor to disperse into the main body of working fluid in the tank.

4,873,451

ELECTRICAL SYSTEM FOR A MOTOR VEHICLE

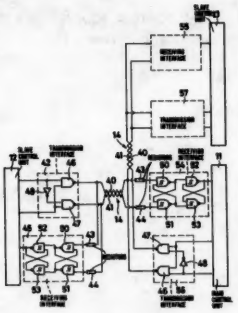
Raffaele Pristerá, Cormano; Edoardo Rugora, Milan; Silvio Fioravazzi, Milan; Giorgio Guelfi, Milan; Aldo Bassi, Milan, and Alberto Poli, Ossona, all of Italy, assignors to Alfa Lancia Industriale S.p.A., Arese, Italy

Filed Dec. 22, 1987, Ser. No. 136,276

Claims priority, application Italy, Dec. 31, 1986, 22903 A/86

Int. Cl.[4] B60L *1/00;* **H02G** *3/00*

U.S. Cl. 307—10.1 **4 Claims**



1. An electrical system for the distribution of electrical power to user devices installed on board a motor vehicle equipped with a dashboard, said electrical system assembly comprising a plurality of electronic microprocessor control units, each of said control units being connected with a source of electrical power and being connected with one another by a multiplex communication bus, one of said control units being a main control unit for controlling the operative functions of the user devices, signaling means being connected to said main control unit for sending signals to said main control unit to indicate user's request for actuation of particular user devices, said control units further including first and second secondary control units, said first and second secondary control units being disposed between said main control unit and selected user devices, said first and second secondary units receiving signals from said main control unit and in turn actuate respective user devices and feed signals to said main control unit indicative of operating conditions of the respective user devices, said multiplex communication bus being a serial interconnection line, said secondary units containing power stages for the actuation of said respective user devices, and being connected to a source of electrical power suitable for said power stages, said serial interconnection line being formed by two leads, said two leads of said communication bus being connected to said main unit and said first and second secondary control units through transmission interfaces and reception interfaces wherein the transmission interface sends to one of said leads a first signal to be transmitted and sends to the other of said leads a second signal which complements said first signal, the reception interface being provided to compare the first and second signals with one another and if the difference is within a pre-established value, the first signal passes into the control unit to which it is addressed.

4,873,452

COLLISION DETECTOR FOR A VEHICLE

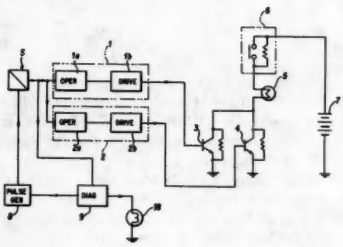
Makie Morota, and Junichi Fukuda, both of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 22, 1988, Ser. No. 247,559

Claims priority, application Japan, Dec. 23, 1987, 62-325769

Int. Cl.[4] B60R *21/08*

U.S. Cl. 307—10.1 **1 Claim**



1. A collision detector for a vehicle comprising:

an acceleration sensor for detecting acceleration of the vehicle;

signal processing circuit which provides a collision signal when a value, based on an output of the acceleration sensor, exceeds a predetermined reference collision level;

a diagnostic pulse generator which applies diagnostic pulses to the acceleration sensor to detect a failure of the acceleration sensor; and

a diagnostic circuit which stops an output of the output diagnostic oulses the diagnostic pulse generator when the output of the acceleration sensor exceeds a malfunction avoidance level which is lower than the predetermined reference collision level.

4,873,453

DC MOTOR SPEED CONTROLLER HAVING PROTECTION

Richard F. Schmerda, and James E. Hansen, both of Oak Creek, Wis., assignors to Eaton Corporation, Cleveland, Ohio

Division of Ser. No. 114,348, Oct. 27, 1987. This application Oct. 19, 1988, Ser. No. 238,447

Int. Cl.[4] H01H *83/12*

U.S. Cl. 307—130 **2 Claims**

1. Speed controller for a DC motor connected in series with a switching device that controls the average DC current of the motor by controlling the switching duty cycle, said switching device having an input control terminal, comprising:

oscillator means for generating an AC signal having controllable duty cycle;

means for communicating said AC signal to said input control terminal of said switching device;

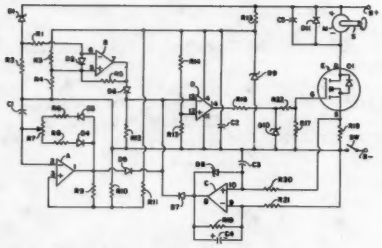
undervoltage protection means for producing an under

voltage signal upon occurrence of a low-battery condition below a predetermined threshold voltage level;

override circuit means communicating said undervoltage signal to said input control terminal of said switching device, for turning off said switching device irrespective of the AC signal of said oscillator means upon an undervoltage condition;

and wherein said undervoltage protection means comprises one operational amplifier circuit having;

means for establishing a first battery voltage threshold corresponding to said predetermined threshold voltage level and a second battery voltage threshold which is higher than said first threshold;



means for providing said undervoltage signal when battery voltage is below said first threshold and withholding said undervoltage signal when battery voltage exceeds said second threshold; and,

means for providing or withholding said undervoltage signal when the batter voltage is between said first and second thresholds, depending upon whether the battery voltage entered between said thresholds when said undervoltage signal was already being provided on already being withheld, respectively;

whereby said operational amplifier circuit performs both (a) a threshold comparator function and (b) a hysteresis function.

4,873,454

POWER SOURCE SWITCHING CIRCUIT

Hisung Kwon, Seoul, Rep. of Korea, assignor to Sam Sung Electronic Co. Ltd., Rep. of Korea

Filed Dec. 23, 1987, Ser. No. 137,149

Claims priority, application Rep. of Korea, Dec. 26, 1986, 86-21232

Int. Cl.[4] H01H *3/26*

U.S. Cl. 307—140 **6 Claims**

1. Apparatus for switching a power source to supply power to different loads, comprising:

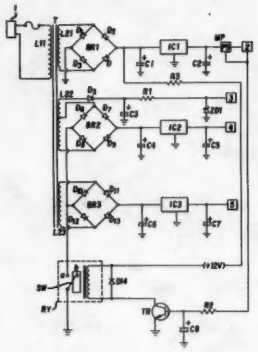
a transformer;

a first bridge-type rectifier, electrically coupled to said transformer;

a plurality of second bridge-type rectifiers, said second bridge-type rectifiers excluding said first bridge-type rectifier, said second bridge-type rectifiers being electrically coupled to said transformer in a parallel configuration;

a switching relay having a coil and a switch;

said second bridge-type rectifiers being electrically connected, in common, to said switch, said switch being electrically interposed between said second bridge-type rectifiers and a ground point;



said switching relay being operative to control said switch in accordance with electrical current applied to said coil.

4,873,455

PROGRAMMABLE FERROELECTRIC POLYMER NEURAL NETWORK

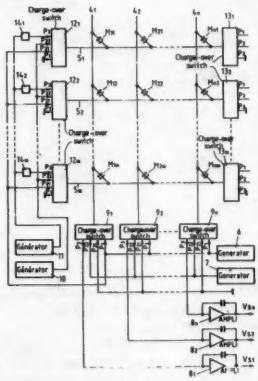
Emmanuel de Chambost, Molieres; Francois Micheron, Gif Sur Yvette; Francois Vallet, Bagnolet, and Jean-Michel Vignolle, Boug la Reine, all of France, assignors to Thomson-CSF, Paris, France

Filed Oct. 17, 1988, Ser. No. 254,805

Claims priority, application France, Oct. 9, 1987, 87 13961

Int. Cl.[4] G06F *15/42;* **H04Q** *9/00;* **G11C** *11/22*

U.S. Cl. 307—201 **12 Claims**

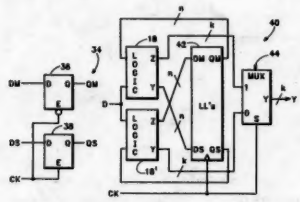


1. A programmable, ferroelectric polymer neural network wherein each synapse (Mij) of the network comprises a memory element, made of a thin layer material or other ferroelectric materials, to memorize a synaptic coefficient a_{ij}, in the form of an electrical charge q_{ij}, and wherein the memory elements a_{ij} of one and the same column j are connected together by one and the same conductor to enable the flow of all the electrical charges generated by pyroelectrical effect at each memory element of the network, when any part of the entire memory (Mij) of the column j is heated.

4,873,456
HIGH SPEED STATE MACHINE

Ronald A. Olisar, Portland, and Daniel G. Knierim, Beaverton, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Jun. 6, 1988, Ser. No. 203,036
Int. Cl.[4] H03K 3/284, 3/29
U.S. Cl. 307—272.1 16 Claims



1. A state machine for generating output signals having states which are a function of the current and previous states of the input signals, with the state machine being controlled by a system clock signal, said state machine comprising:

at least one pair of latches, each pair comprising:

a first latch means having a first input port means, a first output port means and a first enabling port means coupled to the system clock signal, the signal level on said first input port means being transferred to said first output port means while the signal on said first enabling port means is at a first state, and the signal level on said first output port means being latched while the signal on said first enabling port means is at a second state; and

a second latch means having a second input port means, a second output port means, and a second enabling port means coupled to the system clock signal, the signal level on said second input port means being transferred to said second output port means while the signal on said second enabling port means is at the second state, and the signal level on said second output port means being latched while the signal on said second enabling port means is at the first state; and

a logic means having a pair of logic input port means and a pair of logic output port means wherein the levels of the signals on said logic output port means are predetermined logic functions of the levels of the signals on said two logic input port means, a first of said logic input port means being coupled to receive the state machine input signals, and the first of said logic output port means forming the state machine output signals;

the second of said logic input port means being coupled to said first and second output port means of each of said pair(s) of latches; and

the second of said logic output port means being coupled to said first and second input port means of each of said pair(s) of latches.

4,873,457
INTEGRATED SAMPLE AND HOLD CIRCUIT

Sergio A. Sanielevici, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Jul. 5, 1988, Ser. No. 214,973
Int. Cl.[4] G11C 27/02
U.S. Cl. 307—353 9 Claims

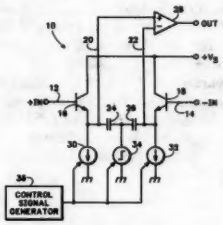
1. A sample and hold circuit comprising:

bipolar transistor means having a base coupled to receive an input signal;

capacitor means coupled to said transistor means for storing a voltage representative of the input signal while said transistor means is turned on, and for storing a voltage representative of the input signal at the time said transistor means is turned off while said transistor means is turned off;

current source means for biasing selectively said transistor means appropriately for turning it on and off; and

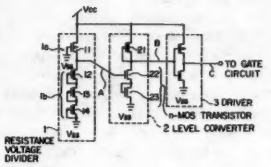
means for applying selectively relatively higher and lower voltages on said capacitor means, and means for controlling said current source means and said voltage applying means such that when said transistor means is biased off the relatively higher voltage is applied to said capacitor means, whereby said capacitor means carries a voltage representative of the input signal when said transistor means was turned off plus the higher voltage.



4,873,458
VOLTAGE LEVEL DETECTING CIRCUIT HAVING A LEVEL CONVERTER

Takuji Yoshida, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Jul. 12, 1988, Ser. No. 218,302
Claims priority, application Japan, Jul. 17, 1987, 62-177125
Int. Cl.[4] H03K 17/30
U.S. Cl. 307—362 11 Claims



1. A voltage level detecting circuit comprising:

a resistance voltage divider comprising a first resistive element connected between a power supply voltage and an output node and a second resistive element connected between said output node and a ground potential for producing a divided voltage, said first resistive element having a resistance variation with respect to temperature which is higher than that of said second resistive element;

a level converter connected between said power supply voltage and said ground potential for converting said divided voltage of said output node into a binary signal having a high voltage signal level substantially equal to said power supply voltage and having a low voltage signal level substantially equal to said potential.

wherein said level converter comprises serially connected MOS transistors having a predetermined switching threshold voltage, whereby the level converter converts said output node voltage into said high voltage signal level when said output node voltage is lower than said switching threshold voltage and converts said output node voltage into said low voltage signal level when said output node voltage is higher than said switching threshold voltage; and

an MOS driver connected between said power supply voltage and said ground voltage for receiving said binary signal and for producing a control signal in response thereto.

4,873,459

PROGRAMMABLE INTERCONNECT ARCHITECTURE

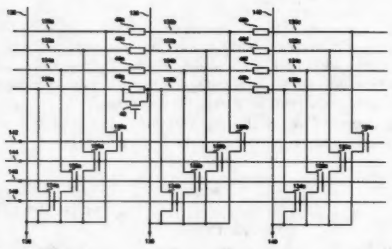
Abbas A. El Gamal, Palo Alto; Khaled A. El-Ayat, Cupertino; Jonathan W. Greene, Palo Alto; Ta-Pen R. Guo, Cupertino, and Justin M. Reyneri, Los Altos, all of Calif., assignors to Actel Corporation, Sunnyvale, Calif.

Continuation-in-part of Ser. No. 909,261, Sep. 19, 1986, Pat. No. 4,758,745. This application May 18, 1988, Ser. No. 195,728

The portion of the term of this patent subsequent to Jul. 19, 2005, has been disclaimed.

Int. Cl.[4] H03K *19/094*

U.S. Cl. 307—465 **12 Claims**



1. In an integrated circuit, a programmable interconnect architecture, including:

a plurality of wiring channels, running in a selected direction each of said wiring channels including a plurality of wiring segments,

a plurality of electrically programmable elements, each having an unprogrammed non-conductive state and a programmed conductive state, said electrically programmable elements connected between adjacent ones of said wiring segments in said wiring channels,

a plurality of programming lines, each of said programming lines associated with corresponding ones of said wiring segments in said plurality of wiring channels,

a plurality of sets of programming transistors, each of said sets including a programming transistor connected between one of said programming lines and one of said corresponding ones of said wiring segments, each of said programming transistors having a control element,

a plurality of control lines, each of said control lines connected to the control elements of the ones of said programming transistors connected to wiring segments in the same wiring channel.

4,873,460

MONOLITHIC TRANSISTOR GATE ENERGY RECOVERY SYSTEM

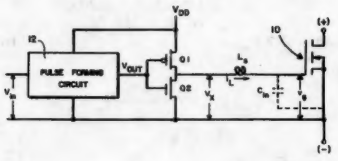
Wally E. Rippel, Altadena, Calif., assignor to California Institute of Technology, Pasadena, Calif.

Filed Nov. 16, 1988, Ser. No. 271,644

Int. Cl.[4] H03K *17/04, 17/687*

U.S. Cl. 307—571 **3 Claims**

1. A pulse forming circuit for control of the gate of an insulated gate semiconductor switch having capacitance between its source and gate electrodes, and inductance in series with its gate electrode comprising means for producing a notch in an applied input control voltage after an interval A following the initial application of the input control voltage for an interval B, and a notch for an interval C following termination of the applied input control voltage followed by a pulse of an interval D, where each interval is a period ΔT given by



$$\Delta T = \frac{\pi}{3} \sqrt{L_s C_{in}}$$

where L_s is said series conductance and C_{in} is said capacitance, comprising means responsive to the initial application of said control input voltage for determining said intervals A and B and means responsive to the termination of said control input voltage for determining said intervals C and D, means responsive to said intervals A and B for producing a notch after initial application of said control input voltage, and means responsive to said intervals C and D for producing a notch after termination of said control input voltage, whereby said notches at the leading and trailing ends of said control input voltage to the gate of said transistor will switch said gate to an off level during said notches of said intervals B and C while switching said gate to an on level during intervals A and D and for the entire period between intervals B and C.

4,873,461

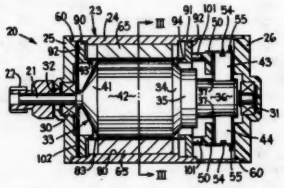
ELECTRIC MOTOR STERILIZABLE SURGICAL POWER TOOL

Thomas J. Brennan, Kalamazoo, and James A. Evans, Galesburg, both of Mich., assignors to Stryker Corporation, Kalamazoo, Mich.

Filed May 13, 1988, Ser. No. 193,882

Int. Cl.[4] H02K *1/18, 5/04, 21/28*

U.S. Cl. 310—47 **16 Claims**



1. An electric motor comprising:

a casing having a peripheral wall;

circumferentially distributed magnets lining the inside of the peripheral wall of the casing;

means on said casing locating said magnets axially and circumferentially with respect to said casing;

an armature and means on said casing rotatably supporting said armature within said casing;

a split sleeve radially interposed between said magnets and said armature;

means bearing on the ends of said split sleeve for expanding said split sleeve radially away from said armature and firmly radially outwardly pressing said sleeve against said magnets and thereby for holding said magnets fixedly against the inner periphery of said casing; and

whereby said magnets are held in place in said casing without need for adhesive bonding to said casing.

4,873,462

STEPPING MOTOR WITH LOW DETENT TORQUE

Timothy J. Harned, East Kingston, N.H., assignor to Eastern Air Devices, Inc., Dover, N.H.

Filed Sep. 16, 1988, Ser. No. 245,787
Int. Cl.[4] H02K *37/00*
U.S. Cl. 310—49 R 17 Claims

1. A synchronous motor comprising, in combination,

a rotor assembly including a cylindrical portion having an axis, said portion having a plurality of annularly spaced rotor teeth projecting radially to a cylindrical peripheral envelope on said axis,

a stator assembly coaxial with said rotor assembly and having a plurality of radially projecting stator poles, said poles each having a plurality of stator teeth projecting radially toward said envelope, the rotor teeth each projecting radially upon two stator teeth,

means for electrically energizing said stator poles,

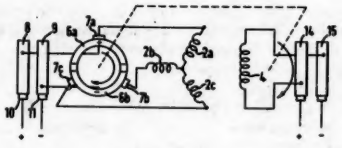
perma.ient magnet means in one of said assemblies for establishing a magnetic field at said rotor teeth, said rotor teeth and stator teeth each extending longitudinally along the stator poles and rotor portion, the plurality of rotor teeth and stator teeth being skewed relative to each other, the annular arc length subtended by the skew as projected on said envelope being substantially equal to the arc length corresponding to the angular pitch of the rotor teeth divided by an integer between two and four.

4,873,463

D.C. ELECTRIC MOTOR

Gareth Jones, 18 The Links, Amlwch, Anglesey, Gwyneed, United Kingdom

PCT No. PCT/GB86/00501, § 371 Date Apr. 16, 1987, § 102(e) Date Apr. 16, 1987, PCT Pub. No. WO87/01247, PCT Pub. Date Feb. 26, 1987
PCT Filed Aug. 22, 1986, Ser. No. 52,045
Claims priority, application United Kingdom, Aug. 22, 1985, 8521009
Int. Cl.[4] H02K *23/16*
U.S. Cl. 310—68 B 3 Claims



1. A d.c. motor which is energizable by a d.c. electrical energy source, said motor comprising:

a stator core having a cylindrical shaped inner surface;

a rotor journalled on a shaft for rotation within the cylindrical shaped inner surface of the stator core, said shaft having an axis;

armature windings inserted in slots in the stator core and being divided into similar armature coils mutually spaced about said shaft axis;

said rotor including field generating means providing magnetic rotor poles mutually spaced about the shaft axis and serving to induce an e.m.f. in each armature coil during rotation of the rotor, said rotor adapted such that the associated radial distance between each magnetic rotor pole and the inner surface of the stator core remain substantially constant as the rotor rotates; and

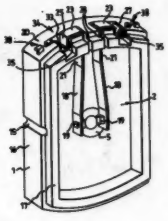
switching means adapted to connect said armature coils to the d.c. source so as to apply an e.m.f. to each armature coil in timed synchronism with rotation of the rotor such that (i) switching of the d.c. to an armature coil occurs when a pole generated by that coil is substantially in alignment with a magnetic rotor pole of opposite polarity, (ii) immediately before switching, the e.m.f. induced in that armature coil is approaching a maximum value and opposes the applied e.m.f., and (iii) immediately after switching, that armature pole and the magnetic rotor pole are of like polarity and the induced e.m.f. assists the applied e.m.f., said armature windings providing a rotating field which is in arrear of and opposes the rotor fields so as to exert a repelling force against the rotor poles, said switching means including a device for sensing rotor position and controlling an electronic means which switches the d.c. source to the armature windings, said electronic control means including power switching devices and means for providing a pulse train to control the power switching devices in which the mark-space ratio of the pulse train is adjustable but, for a given adjustment, is constant over the whole cycle.

4,873,464

TERMINAL IN AN ELECTRIC MOTOR

Patrick S. Wang, Repulse Bay, Hong Kong, assignor to Johnson Electric Industrial Manufactory Limited, Chaiwan, Hong Kong

Filed Mar. 23, 1988, Ser. No. 172,174
Claims priority, application United Kingdom, Mar. 23, 1987, 8706841; Jul. 27, 1987, 8717744
Int. Cl.[4] H02K *5/14, 13/00*
U.S. Cl. 310—249 18 Claims



1. A fractional horsepower DC electric motor having a housing, a rotor comprising an armature and a commutator mounted in the housing, and brushgear mounted in the housing for supplying power from a power supply to said commutator wherein a motor terminal is provided on said motor housing for forming each one of a first and second electrical connection between the power supply and a brush of said brushgear, said terminal comprising a conducting metal strip having a first portion which extends across and is supported by an outside surface of said housing and a second portion contiguous with said first portion and housed within a recess in said outside

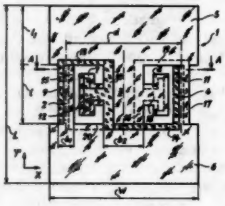
surface of said housing said first portion providing a surface to form said first connection by means of a touch contact and said second portion being arranged to grip a power supply terminal and/or wire lead of said power supply when the power supply terminal or lead is inserted in said recess, thereby to form said second connection.

4,873,465

2T-CUT PIEZOELECTRIC RESONATOR USING COUPLED CONTOUR MODES

Claude Bourgeois, Bôle, Switzerland, assignor to Centre Electronique Horloger S.A., Neuchatel, Switzerland

Filed Nov. 28, 1988, Ser. No. 276,487
Claims priority, application France, Dec. 2, 1987, 87 16733
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—361 8 Claims



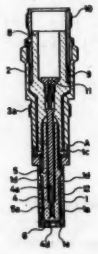
1. A piezoelectric resonator comprising two plates, at least two parallel bars connecting said plates to each other, and means for exciting a vibration of said resonator in a first contour vibration mode, wherein said exciting means are arranged for exciting said vibration in said bars and the cut and dimensions of said resonator are such that at least a second contour vibration mode, different from said first vibration mode, is coupled with said first vibration mode.

4,873,466

IGNITER PLUG

Shuzo Matsumura; Takanori Mizuno; Noboru Aoki, and Takahire Suzuki, all of Nagoya, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Sep. 8, 1987, Ser. No. 93,975
Claims priority, application Japan, Sep. 6, 1986, 61-208874
Int. Cl.[4] H01T *13/20*
U.S. Cl. 313—131 R 2 Claims



1. An igniter plug comprising:

a tubular metallic shell having a diameter-reduced seat at one open end, the seat being tapered to progressively decrease its diameter as approaching an outside of said open end;

a tubular insulator concentrically placed at an inner side of said metallic shell, and having a tapered end face to be in registration with said seat;

a frusto-cone shaped insert ring made of oxidation and heat resistant material, a peripheral end and one entire surface of which are mounted on an upper surface of said seat by means of an electrical resistant welding, said insert ring permitting said tapered end face of said insulator to engage with an upper surface of said insert ring;

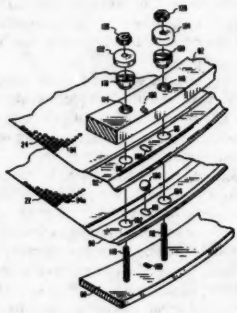
a center electrode concentrically disposed in said insulator, one end of said electrode being terminated short of said tapered end face of said insulator to allow a creeping discharge to occur along an inner surface of said insulator when a high voltage is applied across said center electrode and said insert ring.

4,873,467

ION SOURCE WITH PARTICULAR GRID ASSEMBLY

Harold R. Kaufman, 5920 Obenchain Rd., La Porte, Colo. 80535, and Raymond S. Robinson, Bradbury Ct., Fort Collins, Colo. 80521

Filed May 23, 1988, Ser. No. 197,525
Int. Cl.[4] H01J *27/00*; F02K *9/00*
U.S. Cl. 313—360.1 17 Claims



1. In an ion source having a chamber wherein ions are produced and propelled outwardly through at least a pair of grids having a mutually-aligned respective plurality of apertures, a grid assembly comprising:

first and second grids each of conductive material having an integrally-formed peripheral marginal portion and having, inside said marginal portion, an array of apertures distributed in a predetermined pattern;

a support element having a shape which matches that of and is mounted over the side of the marginal portion of said first grid facing away from said second grid;

a clamp having a shape which matches that of and is mounted over the side of the marginal portion of said second grid facing away from said first grid;

means for securing said clamp to said support element with said marginal portions sandwiched thereinbetween and respectively positioned to mutually align the respective ones of said apertures in said first and second grids;

means defining a first and second mutually aligned series of seats successively spaced around respective ones of said marginal portions;

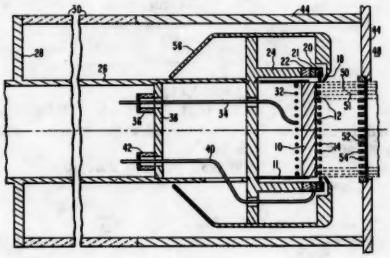
and means, including a plurality of insulators each having a circular cross section and individually seated in and between corresponding ones of said first and second series of seats, for enabling radial movement of said marginal portions relative to each other and relative to said support element and said clamp.

4,873,468

MULTIPLE SHEET BEAM GRIDDED ELECTRON GUN

George V. Miram, Atherton; Michael C. Green, Palo Alto, and George K. Merdinian, Los Altos, all of Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.

Filed May 16, 1988, Ser. No. 194,638
Int. Cl.[4] H01J 3/04, 29/58, 19/04
U.S. Cl. 313—411 11 Claims



1. A gun for projecting multiple sheet electron beams comprising:

a thermionic cathode with a extended emissive surface;

a set of parallel focusing bars, each focusing bar comprising a base portion held in a slot in said extended surface and a focusing portion projecting as a ridge above said surface; and

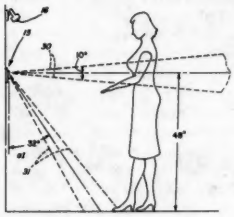
a grid of conductive bars uniformly spaced above said ridges and aligned therewith.

4,873,469

INFRARED ACTUATED CONTROL SWITCH ASSEMBLY

William A. Young, Aurora, Colo.; Wai-Shing Ko, Aurora, Ill.; Curtis R. Davidson, Oswego, Ill., and Thomas Whitehurst, Bensenville, Ill., assignors to Pittway Corporation, Northbrook, Ill.

Continuation-in-part of Ser. No. 52,763, May 21, 1987, Pat. No. 4,823,051. This application Oct. 14, 1987, Ser. No. 107,002
Int. Cl.[4] G01J 5/08; G08B 13/18
U.S. Cl. 315—155 32 Claims



1. An infrared radiation actuated control switch assembly responsive to infrared radiation within a given space for controlling a functional device in response to variations in infrared radiation, indicative of movement of a source of infrared radiation within the space, comprising

sensing means including a sensing element responsive to infrared radiation; optical means; control circuit means; and housing means for containing said sensing means, said optical means and said control circuit means;

said housing means being constructed and arranged for mounting within the space;

said optical means being supported within said housing means and including first planar reflecting means, second planar reflecting means and focusing means, said sensing element being mounted in an operative relation with said focusing means, said first planar reflecting means including a first plurality of planar reflecting segments arranged in juxtaposed relation and inclined at a first vertical angle defining a first reflecting surface for reflecting to said focusing means infrared radiation in a first sensing field extending at a first predetermined semivertical angle within the space, said second planar reflecting means including a second plurality of planar reflecting segments arranged in juxtaposed relation and inclined at a second vertical angle defining a second reflecting surface for reflecting to said focusing means infrared radiation in a second sensing field extending at a second predetermined semivertical angle within the space, and said focusing means having first and second curved reflecting surfaces for focusing onto said sensing element infrared radiation from said first and second sensing fields, respectively, reflected thereto by said first and second planar reflecting means,

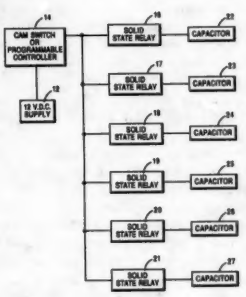
said circuit means being connected to said sensing element and responsive to said sensing element for providing an output for energizing the functional device in response to variation in infrared radiation focused onto said sensing element, indicative of movement of source of infrared radiation within the space.

4,873,470

PROGRAMMABLE ULTRAVIOLET LAMP CONTROL SYSTEM

Robert A. Myers, Viroqua, Wis., assignor to NCR Corporation, Dayton, Ohio

Filed May 27, 1988, Ser. No. 199,987
Int. Cl.[4] H05B 41/14
U.S. Cl. 315—240 6 Claims



1. A variable intensity output arrangement of an ultraviolet lamp system for use in curing printing ink, said arrangement comprising at least one

ultraviolet lamp having a pair of terminals and a lamp ballast transformer operational with alternating current, a

plurality of capacitors coupled to the lamp ballast transformer, said capacitors being selected to enable varying capacitance into the system and thereby provide selected intensities of output of said ultraviolet lamp, a

plurality of relay contactors operably coupled to said capacitors for switching said capacitors into and out of operation, a

direct current control voltage supply means, a

plurality of relay coils operable to actuate the relay contactors, and

control means coupled to said control voltage supply means and to said relay coils for timing operation of the output intensity of the ultraviolet lamp system whereby the lamp ballast is selectively varied from a low intensity output

during one portion of operation to a higher intensity output during another portion of a curing cycle of operation.

4,873,471

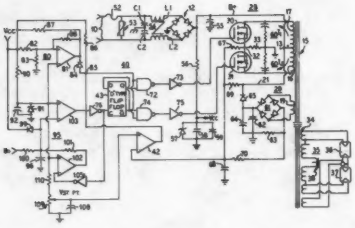
HIGH FREQUENCY BALLAST FOR GASEOUS DISCHARGE LAMPS

Thomas E. Dean, Cookeville; William H. Henrich, Sparta, both of Tenn.; David M. Fischer, Waltham; Lawrence J. Stratton, Lexington, both of Mass., and Herbert E. Pietsch, Cookeville, Tenn., assignors to Thomas Industries Inc., Louisville, Ky.

Continuation-in-part of Ser. No. 845,853, Mar. 28, 1986, abandoned. This application Oct. 8, 1987, Ser. No. 106,180

Int. Cl.[4] H05B *41/36*

U.S. Cl. 315—308 **56 Claims**



54. An electronic circuit for receiving input electrical power at a lower frequency for energizing a load circuit at higher frequency comprising:

voltage source means receiving said input electrical power for generating a source voltage having a varying magnitude and a predetermined minimum voltage, said voltage source means having rectifier circuit means for generating a full-wave rectified voltage and make-up power means receiving power from said full-wave rectified voltage for storing energy for use during periods when the output voltage of said rectifier circuit means falls below said predetermined minimum voltage;

inverter circuit means including first and second switching means connected in circuit with said voltage source means and said load circuit;

logic circuit means responsive to a sensed signal representing current flowing in said switching means for operating said first and second switching means to conduct alternately by switching a conducting one of said switching means to a non-conducting state when the current flowing therein reaches a predetermined value and immediately thereafter switching the other of said switching means to conduct until the current flowing therein reaches a predetermined value, whereby the frequency of current in said load circuit varies as the magnitude of said source voltage varies, said logic circuit means having a bistable circuit having complementary outputs for determining the states of said first and second switching means respectively, sensing circuit means for generating said sensed current signal representative of the instantaneous current flowing through said switching means, and first comparator circuit means receiving said sensed signal for changing the state of said bistable circuit means when said sensed current reaches a predetermined set point signal representative of a desired current level flowing in said switching means;

reactance circuit means connected in circuit with said load circuit, the operating frequency range of said inverter circuit means and the impedance of said reactance circuit means being such that as the magnitude of said source voltage changes the operating frequency of said inverter circuit means changes and the resulting impedance of said reactance circuit means is such that the peak amplitude of current in said load circuit remains substantially constant;

said load circuit having a power transformer coupled in circuit with said voltage source means and said first and second switching means, whereby said sensed current signal is a ramp signal having a rise time slope which increases when the magnitude of said source voltage increases and which decreases when the magnitude of said source voltage decreases, thereby to change the operating frequency of said inverter circuit means; and

first compensating circuit means for adding a first compensating signal to said sensed signal when the amplitude of the voltage of said voltage source means is relatively high, thereby at least partially to compensate for current overshoot in the shutting off of said first and second switching means.

4,873,472

FLAT CATHODE RAY TUBE DISPLAY APPARATUS

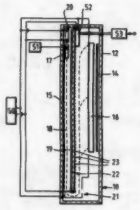
Kenneth G. Freeman, Reigate, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 25, 1988, Ser. No. 262,410

Claims priority, application United Kingdom, Dec. 11, 1987, 8729019

Int. Cl.[4] H01J *29/70, 29/72*

U.S. Cl. 315—366 **20 Claims**



1. A flat cathode ray tube display apparatus comprising a cathode ray tube having an envelope, a luminescent screen extending over a substantially flat faceplate, a deflection electrode array within the envelope extending parallel to the screen and comprising a plurality of individual deflector electrodes, a planar electrode spaced from the deflection electrode array and overlying the screen, means in the envelope for producing and directing a line scanning electron beam substantially parallel to the faceplate between the deflection electrode array and the screen, a drive circuit comprising a plurality of output stages each of which is connected to a respective electrode of the deflection electrode array, the deflection electrode array being operable by the drive circuit for deflecting the line scanning beam in a direction towards said faceplate in field scanning manner whereby the electron beam is scanned over the luminescent screen in a television raster fashion, characterized in that the deflection electrode array comprises one deflector electrode for each conventional standard raster line to be displayed, and in that the drive circuit is operable to switch the voltage applied to each deflector electrode from a first predetermined level to a second predetermined level in sequence so as to step the line-scanning beam in the field direction.

4,873,473

MODULAR MOTOR CONTROLLER

Paul E. Penn, Indianapolis; Roger A. Werckman, Jr., Carmel, and John W. Waymire, Indianapolis, all of Ind., assignors to Dart Controls, Inc., Zionsville, Ind.

Filed Jan. 28, 1988, Ser. No. 149,624

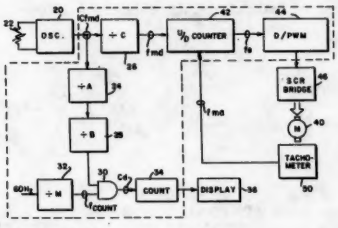
Int. Cl.[4] G05B *5/00*

U.S. Cl. 388—814 **32 Claims**

1. An apparatus for controlling a motor, the apparatus comprising

an oscillator for providing a source of periodic signals;

means for converting the oscillator output into desired motor rotation frequency signals;
means for generating actual motor rotation frequency signals;
means for comparing the actual and desired motor rotation frequency signals and for generating a rotation frequency error signal;
means for controlling motor rotation frequency;
means for coupling the oscillator to the means for converting the oscillator output into desired motor rotation frequency signals;
means for coupling the means for converting the oscillator output into desired motor rotation frequency signals to the means for comparing the actual and desired motor rotation frequency signals and for generating a rotation frequency error signal;



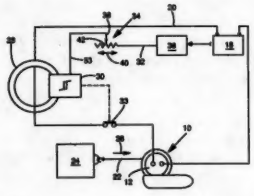
means for coupling the means for comparing the actual and desired motor rotation frequency signals and for generating a rotation frequency error signal to the means for controlling motor rotation frequency;
means for coupling the means for generating actual motor rotation frequency signals to the means for comparing the actual and desired motor rotation frequency signals and for generating a rotation frequency error signal;
means for generating a counting gate during which signals are to be counted;
means for counting signals;
means for displaying the number of signals counted during the counting gate;
means for coupling at least one of the means for generating a counting gate and the oscillator to the means for counting signals; and
means for coupling the signal count display means to the means for counting signals.

4,873,474

WINCH WITH SHUT-OFF LOAD LIMITER

Richard G. Johnson, Portland, Oreg., assignor to Warn Industries, Inc., Milwaukie, Oreg.

Filed Apr. 20, 1989, Ser. No. 341,431
Int. Cl.[4] H02P 7/00
U.S. Cl. 318—434 **2 Claims**



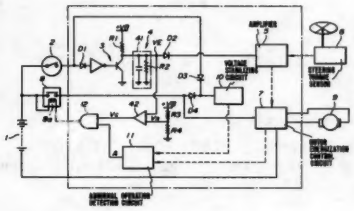
1. A winch comprising;
a winching mechanism including a rotatable winch reel, a cable wound onto the reel adapted for being wound at least in part onto and off of the reel, and an electric motor for rotating the reel and winding the cable onto the reel and in a process pulling a load connected to the cable;
an electrical power source providing electrical power to the motor, a load limit switching means for shutting off the power to the motor, and a hall effect switch responsive to the magnetic field generated by the electrical power source for activating the switching means and automatically shutting off the motor in response to a power demand by the motor indicating a load being pulled that exceeds an established load limit, and the improvement that comprises;
a first conducting line from the electrical power source to the motor and a magnetic field detector means placed in proximity to the first conducting line for detecting the magnetic field generated in the first conducting line as an indicator of the power demand by the motor, said detector means connected to the hall effect switch and conveying the level of magnetic field detected in the first conducting line to the hall effect switch;
a secondary power source providing a determined voltage through a second conducting line to the hall effect switch, and a potentiometer placed in the second conducting line between the secondary power source and hall effect switch, said potentiometer adapted to reduce the voltage from the secondary power source to the hall effect switch, and control means for controlling the amount of voltage reduction by the potentiometer and thereby determining in part the required magnetic field in the first conducting line of the motor required for activating the hall effect switch and the load limit switching means for shutting off the motor.

4,873,475

ELECTRICALLY POWERED POWER STEERING SYSTEM FOR INDUSTRIAL VEHICLE OR THE LIKE

Sigeru Togo, Akigawa; Yoichi Saito, Musashimurayama; Masayuki Tateyama; Genji Okuma, both of Oume, and Hiroya Miyazaki, Maebashi, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Jul. 29, 1987, Ser. No. 79,068
Int. Cl.[4] B62D 5/04
U.S. Cl. 318—489 **7 Claims**



1. A power steering system, comprising:
a sensor for sensing the direction in which a steering column is being rotated and producing an output signal indicative thereof;
an electric motor;
a motor control circuit for controlling the motor in response to the output signal of the sensor;
a source of electrical power;
a manually operable switch;
a power supply circuit which supplies power from the source to the motor control circuit when the switch is closed; and
means for gradually decreasing the supply of electrical

power from said source to said motor control circuit for a predetermined time after the switch is opened.

4,873,476

ROBOT CONTROL APPARATUS FOR CONTROLLING A MANIPULATOR THROUGH A ROBOT ARM HAVING A PLURALITY OF AXES

Mitsuo Kurakake, Hino; Keiji Sakamoto, and Takashi Iwamoto, both of Hachioji, all of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

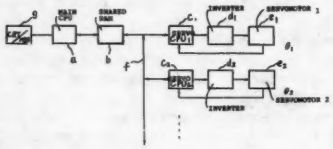
PCT No. PCT/JP87/00162, § 371 Date Sep. 23, 1987, § 102(e) Date Sep. 23, 1987, PCT Pub. No. WO87/05721, PCT Pub. Date Sep. 24, 1987

PCT Filed Mar. 14, 1987, Ser. No. 110,727

Claims priority, application Japan, Mar. 14, 1986, 61-56433; Mar. 14, 1986, 61-56434; Mar. 14, 1986, 61-56435

Int. Cl.[4] B25J *9/12*

U.S. Cl. 318—568.22 **5 Claims**



1. A robot control apparatus for controlling the attitude of a manipulator through the intermediary of a robot arm having a plurality of axes, comprising:

servomotors of respective plural axes for driving said robot arm;

a plurality of arithmetic means, one for each of said servomotors, for calculating drive torques of respective servomotor control systems;

a bus line interconnecting said arithmetic means so that one of said arithmetic means can access information from the rest of said arithmetic means relating to other axes necessary for drive torque calculation;

memory means for holding information relating to each of the axes necessary for calculation of an equation of motion of said manipulator, said memory means being commonly accessible from each of said arithmetic means; and

data input means for inputting, to prescribed ones of the arithmetic means, the weight of a hand at a distal end of said robot arm and the weight of a workpiece gripped by said hand,

the robot arm having the plurality of axes being an arm of a horizontal articulated-type robot, each arm of which rotates in a horizontal plane.

4,873,477

DRIVING CIRCUIT FOR ACTUATOR

Jun Hirotomi, Tokyo, Japan, assignor to Seiko Instruments Inc., Japan

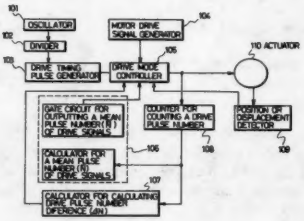
Filed Sep. 1, 1988, Ser. No. 239,537

Claims priority, application Japan, Sep. 8, 1987, 62-224849

Int. Cl.[4] G05B *1/06*

U.S. Cl. 318—603 **4 Claims**

1. In an actuator drivable to intermittently move through a given displacement, a drive circuit for driving the actuator comprising: oscillator means for generating a clock signal; divider means for frequency-dividing the clock signal; timing means for producing a drive timing signal effective to time the drive of the actuator in response to the frequency-divided clock signal; displacement detecting means for detecting the given displacement of the actuator; counting means for counting an amount of drive signals applied to the actuator during each intermittent drive thereof; setting means for setting a drive condition of the actuator according to counted data from the counting means; drive detecting means for detecting a drive state of the actuator; and controller means for selecting a plurality of drive modes of the actuator according to the set


OSCILLATOR
DIVIDER
DRIVE TIMING PULSE GENERATOR
MOTOR DRIVE SIGNAL GENERATOR
DRIVE MODE CONTROLLER
110 ACTUATOR
GATE CIRCUIT FOR OUTPUTTING A MEAN PULSE NUMBER (N) OF DRIVE SIGNALS
COUNTER FOR COUNTING A DRIVE PULSE NUMBER
POSITION OR DISPLACEMENT DETECTOR
CALCULATOR FOR A MEAN PULSE NUMBER (N) OF DRIVE SIGNALS
CALCULATOR FOR CALCULATING DRIVE PULSE NUMBER DIFFERENCE (ΔN)

drive condition and detected drive state to thereby control the drive of the actuator.

4,873,478

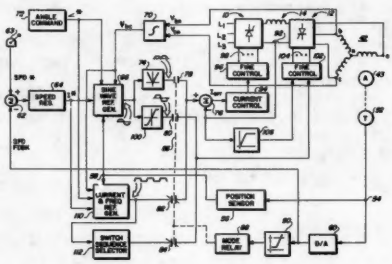
METHOD AND APPARATUS FOR CONTROLLING AN ALTERNATING CURRENT MOTOR PARTICULARLY AT LOW SPEEDS

Herbert W. Weiss, Salem, Va., assignor to General Electric Company, Salem, Va.

Continuation of Ser. No. 876,031, Jun. 19, 1986, abandoned. This application Dec. 12, 1988, Ser. No. 282,902

Int. Cl.[4] H02P *1/26*

U.S. Cl. 318—779 **27 Claims**



1. In a system for controlling the electrical power supplied to a polyphase alternating current motor having individual phase windings from a polyphase alternating current source using a supply channel including a controllable alternating current to direct current source side converter connected to a direct current to alternating current load side converter by way of a link circuit, a method of effecting low frequency operation of said motor comprising the steps:

(a) operating said source side converter to provide a single output of half sine wave currents of the same polarity within a range of desired frequencies;

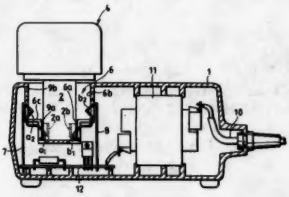
(b) operating said load side converter as a reversing switch to thereby convert said half sine wave currents to one single phase sine wave alternating current electrical power; and,

(c) furnishing only said one single phase sine wave power to at least two of said motor phase windings in effective series connection.

4,873,479
BATTERY CHARGER

Yoshio Iimura, Mito, and Kazuyuki Nagahara, Katsuta, both of Japan, assignors to Hitachi Koki Company, Ltd., Tokyo, Japan

Filed Sep. 20, 1988, Ser. No. 246,712
Claims priority, application Japan, Sep. 25, 1987, 62-146944[U]
Int. Cl.[4] H01M *10/46*; H02J *7/00*
U.S. Cl. 320—2 **6 Claims**



1. A battery charger comprising:

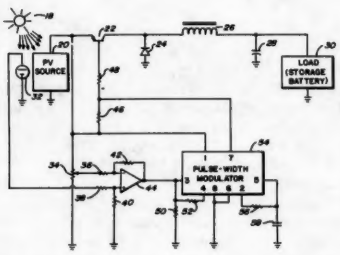
a body having a recess and a step, the recess having first and second portions divided by the step, the first and second recess portions having shapes corresponding to at least parts of different shapes of first and second battery packs for accommodating at least parts of the first and second battery packs respectively, the first portion extending above the second portion as viewed in a direction along a depth of he recess, the first portion is wider than the second portion; and

charging electrodes extending in a direction along the depth of the recess and having first and second projections, the first projections extending into the first recess portion, the second projections extending into the second recess portion, wherein the charging electrode first projections contact battery electrodes of the first battery pack when the first battery pack is inserted into the first recess portion, and wherein the charging electrode second projections contact battery electrodes of the second battery pack when the second battery pack is inserted into the second recess portion.

4,873,480
COUPLING NETWORK FOR IMPROVING CONVERSION EFFICIENCY OF PHOTOVOLTAIC POWER SOURCE

Donald L. Lafferty, 878 Chestnut St., San Francisco, Calif. 94133

Filed Aug. 3, 1988, Ser. No. 227,698
Int. Cl.[4] G05F *5/00*
U.S. Cl. 323—229 **7 Claims**



1. A control circuit for matching the electrical impedance of a photovoltaic power source and a load driven therefrom, comprising:

voltage sensing means, comprising a photovoltaic cell, for providing a reference voltage indicative of a desired output voltage of said photovoltaic power source,

circuit means for comparing the actual voltage of said photovoltaic power source and said reference voltage for producing a difference signal indicative of the difference, if any, between said reference voltage and said actual voltage of said photovoltaic power source,

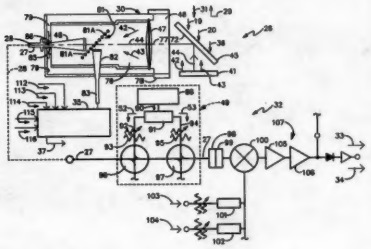
control means, connected to said circuit means, for producing a modulated control signal, the modulation of said control signal being indicative of said voltage difference,

switching means for repetitively switching on and off the current flow from said photovoltaic power source to said load, said switching means being responsive to said control signal to vary the proportion of time that said current is switched on in relation to the proportion of time that said current is switched off so as to maintain the output voltage of said photovoltaic power source at a substantially constant level, whereby maximum power is transferred from said photovoltaic power source to said load, even when the solar radiation intensity received by, and ambient temperature of, said photovoltaic source vary.

4,873,481
MICROWAVE RADIOMETER AND METHODS FOR SENSING ATMOSPHERIC MOISTURE AND TEMPERATURE

Loren D. Nelson, Morrison; Lee A. Erb; Randolph H. Ware, both of Boulder, and Donald Rottner, Littleton, all of Colo., assignors to Radiometrics Corporation, Littleton, Colo.

Filed Feb. 16, 1988, Ser. No. 156,614
Int. Cl.[4] G01W *1/02, 1/08*
U.S. Cl. 324—58.5 R **37 Claims**



1. A multi-channel, passive microwave radiometer for determining the water vapor content and the liquid content in the atmosphere, comprising:

antenna means for receiving atmosphere signals having frequencies in two separate ITU protected bands, a first of which frequencies being above a given frequency of relative maximum water vapor absorption and a second of which frequencies being near a relative minimum in the water vapor absorption spectra; and

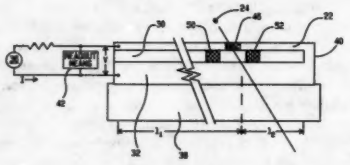
a single radiometer responsive alternately to said received atmospheric signals from said antenna means at the first frequency and at the second frequency for generating output signals alternately representing such water vapor and such liquid content in the atmosphere from which such atmospheric signals were received.

4,873,482

SUPERCONDUCTING TRANSMISSION LINE PARTICLE DETECTOR

Kenneth E. Gray, Naperville, Ill., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jul. 28, 1988, Ser. No. 225,412
Int. Cl.[4] G01N *27/00*
U.S. Cl. 324—71.4 **12 Claims**



1. A microvertex detector for tracking charged subatomic particles comprising:

a plurality of superconducting transmission line waveguides positioned to be capable of intercepting the trajectory of a moving subatomic particle, said plurality superconducting transmission line waveguides capable of carrying current supplied by a current source and

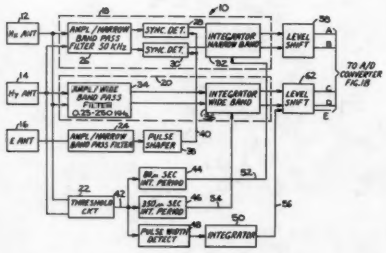
readout means responsive to said plurality superconducting transmission line waveguides whereby the position of a particle passing through any of said plurality of superconducting transmission line waveguides can be determined.

4,873,483

MULTI INPUT LIGHTNING DETECTION SYSTEM

Kenneth A. Ostrander, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 145,276, Jan. 19, 1988, Pat. No. 4,803,421. This application Nov. 18, 1988, Ser. No. 273,081
Int. Cl.[4] G01W *1/16*
U.S. Cl. 324—72 **4 Claims**



1. An apparatus for determining geographic locations of electrical disturbances generated by weather phenomena relative to an observation location, comprising

means for independently receiving signals associated with the electromagnetic fields generated by said electrical disturbances which are indicative of the direction from the observation location to the location of the disturbances,

means for isolating from said received signals at least first components of said fields, the intensities of which are inverse functions of the distance between the discharges and the observation location,

means responsive to said received signals for generating pulse width signals proportional to the time between the beginning of each of the discharges and the first zero crossing of that discharge,

means for simultaneously combining said first components and said pulse width signals and for deriving therefrom a range signal which is indicative of said distance, the inclusion of the pulse width signals in deriving said range signal thereby improving the accuracy of said range signal, and

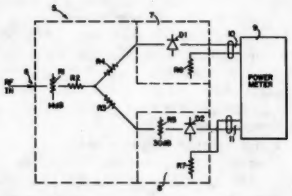
means responsive to said direction indicative received signals for deriving a direction signal, whereby said range and direction signals may be used to control display means to provide a map-like display of the location of said disturbances relative to said observation location.

4,873,484

EXTENDED RANGE COMPOSITE HEAD POWER SENSOR WITH THREE CIRCUIT BRANCHES HAVING A COMMON NODE

Stephen F. Adam, Los Altos, Calif., assignor to Lucas Weinschel, Inc., Gaithersburg, Md.

Filed Sep. 3, 1987, Ser. No. 92,755
Int. Cl.[4] G01R *15/08, 21/00, 21/10*
U.S. Cl. 324—95 **14 Claims**



1. A power sensor for detecting the power of a signal from a signal source, comprising:

(a) circuit means for dividing said signal having first, second and third branches having a common node,

said first branch comprising first and second resistors, said first branch extending between the node and input means for receiving said signal,

said second branch comprising a third resistor connected in series with a first diode for conduction of a signal within a first predetermined power range,

said third branch comprising fourth and fifth resistors connected with a second diode for conduction of a signal within a second predetermined power range; and

(b) said second and third branches extending from said node to output means responsive to the signals on said second and third branches for providing an output signal characteristic of the power level of the signal from the signal source.

4,873,485

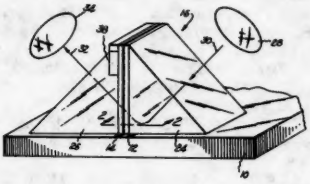
ELECTRO-OPTIC SIGNAL MEASUREMENT

Steven L. Williamson, Henrietta, N.Y., assignor to The University of Rochester, Rochester, N.Y.

Filed Jul. 13, 1988, Ser. No. 218,178
Int. Cl.[4] G01R *19/00, 19/155*
U.S. Cl. 324—96 **26 Claims**

1. The method of measuring an electrical signal on a conductor at a predetermined location spatially of said conductor which comprises the steps of placing a probe of electro-optical material in the electrical fringe field from said conductor at said location; passing a beam of light through said probe; converting said beam after passage through said probe into a

second electrical signal; and generating, with a third electrical signal, a field at said probe, which cancels said fringe field, in



response to said second electrical signal, said third signal providing a measurement of said first named signal.

4,873,486

MAGNETIC RESONANCE SPECTROMETER

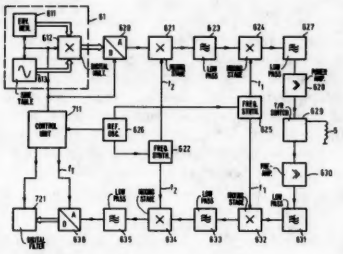
Michael H. Kuhn, Hamburg; Thomas Helzel, Kaltenkirchen; Roland Proksa, Hamburg, all of Fed. Rep. of Germany, and Noel J. M. Van Den Berg, Putte, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.

Filed Sep. 8, 1988, Ser. No. 241,635

Claims priority, application Fed. Rep. of Germany, Sep. 10, 1987, 3730293

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—307 **16 Claims**



1. A magnetic resonance spectrometer comprising a receiving branch in which means, including successive first and second mixing stages is provided for transposing a received spin resonance signal having a first frequency band (B_1) of useful frequencies into a lower third frequency band (B_3) having a lowest useful frequency greater than zero and in which an analog-to-digital converter **(636)** converts the spin resonance signal thus transposed into the lower frequency range band (B_3) into a series of digital data words, said analog-to-digital converter having a sampling frequency (f_l) at least twice as high as the highest useful frequency in the lower frequency band (B_3) characterized in that in the first mixing stage **(632)** the spin resonance signal is mixed with a first frequency **(f1)** in the vicinity of the Larmor frequency, but lying outside of said first frequency band (B_1) in order to produce an output signal in which said first frequency band (B_1) is transposed to a second frequency band (B_2) substantially lower than said first frequency band (B_1), and in that in the second mixing stage **(634)** the output signal of the first mixing stage is mixed with a second frequency **(f2)** substantially lower than the first frequency **(f1)** in the vicinity of but lying outside of said second frequency band (B_2) in order to reduce an output signal in which said second frequency band (B_2) is transposed to a frequency band which is substantially lower than said second frequency band (B_2).

4,873,487

METHOD AND ARRANGEMENT FOR SUPPRESSING COHERENT INTERFERENCES IN MAGNETIC RESONANCE SIGNALS

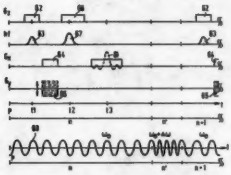
Peter Van Der Meulen, Eindhoven, Netherlands, assignor to U.S. Philips Corp., NY, N.Y.

Filed May 27, 1987, Ser. No. 54,476

Claims priority, application Netherlands, Feb. 4, 1987, 8700266

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—314 **5 Claims**



5. An arrangement for determining a nuclear magnetization spatial distribution in a part of a body, this arrangement comprising means for producing a stationary magnetic field, means for producing magnetic field gradients and means for producing a reference signal, as well as transmitter means for transmitting a high-frequency electromagnetic pulse which is formed in the transmitter means by means of the reference signal, and receiver means for receiving and detecting by means of the reference signal a resonance signal which is excited in the body by at least one high-frequency electromagnetic pulse, and processing means for processing the detected resonance signals by means of a Fourier transformation, characterized in that for smearing out over the determined spatial distribution, artefacts due to coherent interferences, the arrangement comprises means for varying the value of the phase of the reference signal before the transmission of the at least one high-frequency electromagnetic pulse.

4,873,488

INDUCTION LOGGING SONDE WITH METALLIC SUPPORT HAVING A COAXIAL INSULATING SLEEVE MEMBER

Thomas D. Barber; Richard N. Chandler, both of Houston, and John F. Hunka, Kingwood, all of Tex., assignors to Schlumberger Technology Corporation, Houston, Tex.

Division of Ser. No. 718,003, Apr. 3, 1985, Pat. No. 4,651,101, which is a continuation-in-part of Ser. No. 584,059, Feb. 27, 1984, abandoned. This application Nov. 18, 1986, Ser. No. 932,231

The portion of the term of this patent subsequent to Mar. 17, 2004, has been disclaimed.

Int. Cl.[4] G01V *3/28*

U.S. Cl. 324—339 **2 Claims**

1. An induction logging sonde adapted to be passed through a borehole for electromagnetically exploring earth formations traversed by the borehole comprising:

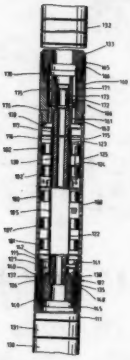
a high strength, electrically conductive, longitudinal support member having a substantially continuous outer surface to favor the flow of eddy currents;

an insulating sleeve member coaxial with and supported by said support member;

at least one transmitter solenoid coil coaxial with and supported by said sleeve member said coil transmitting at a frequency between about 10–400 KHz for generating an electromagnetic field substantially free from dielectric effects, which field induces currents in the formation and

induces said eddy currents circularly around the surface of said longitudinal support member;

a first receiver array coaxial with and supported by said sleeve member and having a primary receiver solenoid coil disposed a first longitudinal distance on one side of said transmitter solenoid coil; and



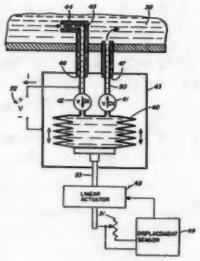
a second receiver array coaxial with and supported by said sleeve member and having a primary receiver solenoid coil disposed a second longitudinal distance on the side of said transmitter solenoid coil which is opposite that on which said first receiver array is mounted and where said second distance is greater than said first distance.

4,873,489

METHOD AND APPARATUS FOR MEASUREMENT OF CHARGE ENTRAINED IN FLUIDS

James R. Melcher, Lexington; Alfred J. Morin, II, Cambridge, and Markus Zahn, Lexington, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Mar. 2, 1988, Ser. No. 163,384
Int. Cl.[4] G01R *31/12*
U.S. Cl. 324—453 **51 Claims**



3. Apparatus as claimed in claim2 wherein the probe is recessed inside the conducting shield by a distance that is on the order of the width of an aperture in the shield through which the fluid is received.

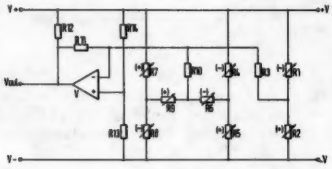
4. Apparatus as claimed in claim 1 wherein the container is filled through a port which is recessed inside the conducting shield by a distance that is on the order of the width of an aperture in the shield through which the fluid is received.

4,873,490

CIRCUIT ARRANGEMENT FOR GENERATING AN OUTPUT SIGNAL THAT IS NONLINEARLY DEPENDENT ON THE TEMPERATURE

Hans Hecht, Korntal, and Winfried Kuhnt, Stuttgart, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

PCT No. PCT/DE87/00118, § 371 Date Dec. 10, 1987, § 102(e) Date Dec. 10, 1987, PCT Pub. No. WO87/06337, PCT Pub. Date Oct. 22, 1987
PCT Filed Mar. 19, 1987, Ser. No. 150,661
Claims priority, application Fed. Rep. of Germany, Apr. 16, 1986, 3612809
Int. Cl.[4] G01K *7/00*; G06G *7/12, 7/00*; H01L *31/00*
U.S. Cl. 328—3 **3 Claims**



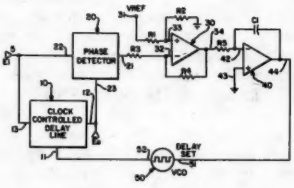
1. A circuit arrangement for generating a signal that is nonlinearly dependent on the temperature, comprising two power supply lines; a temperature-dependent resistor bridge circuit having two pairs of series connected resistors of opposite temperature coefficients interconnected at two opposite junction points; each of said junction points corresponding to a connection point of a resistor having a positive temperature coefficient and a resistor having a negative temperature coefficient; said opposite junction points being connected between said power supply lines; a series circuit of a resistor having a negative temperature coefficient and a resistor having a positive temperature coefficient being connected between the connection points of said series connected resistor in said two pairs whereby the non-linearly dependent signal is formed at the connection point of the two resistors of said series circuit.

4,873,491

PHASE SHIFT CIRCUIT UTILIZING A VARIABLE TIME DELAY LINE

Jeffrey K. Wilkins, P.O. Box 4223, Stanford, Calif. 94305

Filed Oct. 19, 1987, Ser. No. 110,674
Int. Cl.[4] H03K *5/159, 5/13*
U.S. Cl. 328—155 **7 Claims**



1. A phase modulator comprised of:

an input signal to be phase modulated;

a clock-controlled delay line used to provide a time delay of said input signal;

a phase detector which measures the phase difference between said input and output of said clock-controlled delay line, output of said phase detector being a voltage that is a function of said phase difference;

a differential operational amplifier generating an error voltage by comparing the output of said phase detector and a time-varying reference voltage;

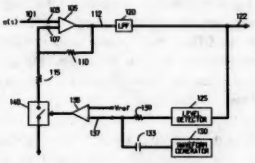
said time-varying reference voltage being a function of a desired amount phase modulation;
said error voltage being applied to the input of an integrator;
output of said integrator being a feedback control signal;
said feedback control signal being applied to the input of a voltage-controlled oscillator;
output of said voltage controlled oscillator being a square wave used to set said time delay of said clock-controlled delay line;
output of said clock-controlled delay line being phase modulated from said input signal by the desired amount.

4,873,492

AMPLIFIER WITH MODULATED RESISTOR GAIN CONTROL

Robert E. Myer, Denville, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 5, 1988, Ser. No. 280,076
Int. Cl.[4] H03G *3/20*
U.S. Cl. 330—86 **27 Claims**



1. A circuit for controlling the gain of an amplifier operating over a prescribed frequency range having an input and an output comprising:
means coupled to the output of the amplifier for generating a first signal representative of the output level of the amplifier,
means for generating a second signal having predetermined waveform repeated at a rate greater than the reciprocal of twice the upper frequency of the prescribed frequency range;
means connected to the first and second signal generating means for forming a third signal having a level corresponding to the first signal and variations therefrom corresponding to the second signal;
means for generating a reference threshold; and
means connected to the amplifier responsive to the third signal and the reference threshold for determining the gain of the amplifier including
at least one switched impedance element; and
means jointly responsive to the third signal and said reference threshold for altering the value of the switched impedance element at the repetition rate of the second signal.

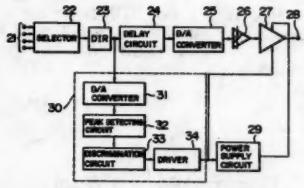
4,873,493

AUDIO AMPLIFIER

Nobuo Fujiwara, Yokohama, Japan, assignor to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Feb. 19, 1988, Ser. No. 158,919
Claims priority, application Japan, Feb. 20, 1987, 62-38362; Feb. 20, 1987, 62-38363
Int. Cl.[4] H03G *3/18*
U.S. Cl. 330—285 **7 Claims**

1. An audio amplifier for amplifying an input signal thereto comprising:
a delay circuit for delaying the input signal;
an amplifier circuit having an amplification device for amplifying an output signal of said delay circuit, said amplifier circuit having a variable operating point;
a power supply circuit capable of changing a supply voltage to said amplifier circuit; and
a control circuit for detecting a level of said input signal to output a control signal corresponding to said level, said



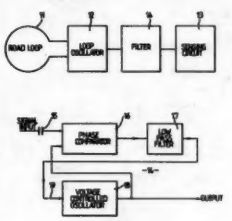
control signal being coupled to said amplifier circuit for changing the operating point of said amplifier circuit and being also coupled to said power supply circuit for changing said supply voltage to said amplifier circuit in response to a level change of said input signal.

4,873,494

INDUCTIVE LOOP PRESENCE DETECTOR WITH CROSS TALK FILTER

Brian C. Jefferis, Hampshire, United Kingdom, assignor to Sarasota Automation Limited, Winchester, United Kingdom

Filed Mar. 13, 1984, Ser. No. 589,250
Claims priority, application United Kingdom, Mar. 16, 1983, 8307280
Int. Cl.[4] G08G *1/07*
U.S. Cl. 331—65 **2 Claims**



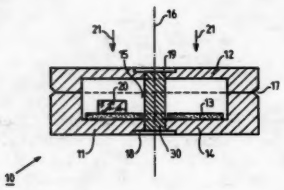
1. A system including a plurality of inductive loop presence detectors, each of said presence detectors comprising an inductive loop to (11) sense the presence of an object to be detected, a loop oscillator (12) having said inductive loop connected thereto as an element determining frequency of oscillation, sensing circuitry (13) to detect changes in the loop oscillator frequency due to the movement of an object to be detected in the vicinity of said loop, and a filter network (14) inserted between the loop oscillator output and the input of said sensing circuitry, said filter network comprising a phase-locked loop including a filter (17) with a pass band sufficiently low to attenuate beat frequency components due to cross talk caused by mutual interference between said plurality of inductive loop detectors.

4,873,495

ULTRAHIGH-FREQUENCY OSCILLATOR HAVING A DIELECTRIC RESONATOR STABLE WITH RESPECT TO MECHANICAL VIBRATIONS

Daniel Doyen, Limeil-Brevannes, and Tarcisio Vriz, Montgeron, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 30, 1988, Ser. No. 238,689
Claims priority, application France, Sep. 4, 1987, 87 12278
Int. Cl.[4] H03B 5/18
U.S. Cl. 331—68 2 Claims



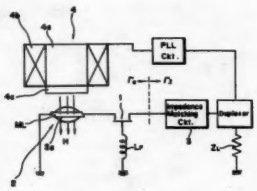
1. An ultrahigh-frequency oscillator (10) stabilized by a dielectric resonator (20) comprising a housing (11) closed by a cover (12) and having a circuit (13) including a dielectric resonator (20) fixed in the bottom (14) of the housing (11), characterized in that a column (30) situated in the central part (15) of the housing (11) rigidly connects the bottom (14) of the housing (11) to the cover (12), and in that the dielectric resonator (20) is arranged outside the said central part (15).

4,873,496

TUNED OSCILLATOR

Takahiro Ohgihara; Yoshikazu Murakami; Yasuyuki Mizunuma, all of Kanagawa, and Hiroyuki Nakano, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 8, 1988, Ser. No. 281,289
Claims priority, application Japan, Dec. 14, 1987, 62-315650
Int. Cl.[4] H03B 5/18
U.S. Cl. 331—96 7 Claims



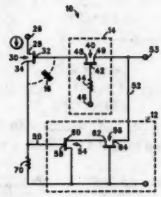
1. A. tuned oscillator comprising;
an active element for oscillation,
a ferromagnetic resonance element formed of a ferrimagnetic thin film and a transmission line connected as a part of feedback for said active element,
a matching circuit connected to said active element, and a bias magnetic field means applying a D.C. bias magnetic field to said ferrimagnetic thin film,
said matching circuit being designed to reflect a fundamental wave generated by said ferromagnetic resonance element and said active element and to pass a second harmonic wave of said fundamental wave.

4,873,497

WIDE BAND VOLTAGE CONTROLLED R-C OSCILLATOR FOR USE WITH MMIC TECHNOLOGY

Ronald F. Kielmeyer, Jr., Chandler, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 3, 1988, Ser. No. 252,204
Int. Cl.[4] H03B 5/24
U.S. Cl. 331—108 B 18 Claims



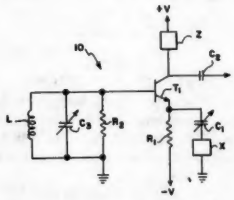
1. A wide band tunable microwave oscillator for monolithic microwave integrated circuits comprising:
feedback loop means for providing a feedback signal for oscillation, said feedback loop means comprising:
transistor capacitance means for supplying gain and phase shift for oscillation, said transistor capacitance means including an input and an output;
variable resistor means for supplying a voltage variable resistance, said variable resistor means having a first input and an output coupled to said input of said transistor capacitance means; and
amplifier means for providing an amplification to said feedback signal, said amplifier means including an input coupled to said output of said transistor capacitance means, and an output coupled to said first input of said variable resistor means.

4,873,498

REFLECTION OSCILLATORS EMPLOYING SERIES RESONANT CRYSTALS'

Leonard L. Kleinberg, Annapolis, Md., assignor to The United States of America as represented by the Administrator, National Aeronautics and Space Administration, Washington, D.C.

Filed Dec. 30, 1988, Ser. No. 292,037
Int. Cl.[4] H03B 5/12
U.S. Cl. 331—116 FE 8 Claims

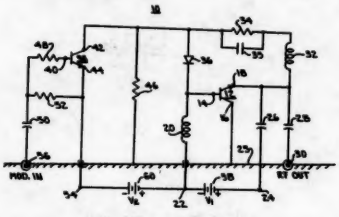


1. A reflection oscillator including an active device with at least two terminals operated in its roll-off region and further including two tuned circuits, one of which is connected to one terminal of said device and the other of which is connected to another terminal of said device.

4,873,499
FAST RISE PULSE OSCILLATOR

Marshall M. Algor, Conover, N.C., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 26, 1988, Ser. No. 199,824
Int. Cl.[4] H03B 5/12
U.S. Cl. 331—117 R 9 Claims

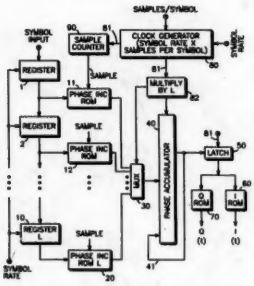


1. An oscillator for producing an output having fast rise time oscillations comprising:
an output terminal;
a first power supply terminal;
a second power supply terminal;
an oscillator transistor having a collector connected to said first power supply terminal, an emitter connected to said output terminal, and a base;
a step recovery diode connected to the base of said oscillator transistor;
a tank circuit connected between said second power supply terminal and the base of said oscillator transistor;
first network biasing means connected to said first power supply terminal for effectuating a forward bias current through said step recovery diode;
second network biasing means connected to said step recovery diode for reverse biasing said step recovery diode to produce a momentary reverse current that causes an internal transient in said tank circuit immediately prior to initiation of oscillations.

4,873,500
PHASE ACCUMULATION CONTINUOUS PHASE MODULATOR

Thad J. Genrich, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 29, 1988, Ser. No. 188,440
Int. Cl.[4] H04L 27/12
U.S. Cl. 332—104 27 Claims

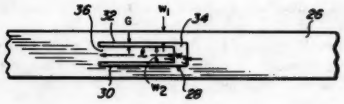


1. A phase accumulator continuous phase modulator having a symbol input and a symbol clock input, said phase accumulator continuous phase modulator providing a phase state signal of said symbol input, said phase accumulator continuous phase modulator comprising:
register means connected to said symbol input and to said symbol clock input, said register means operating to sequentially store a plurality of bits of each symbol;
clock means connected to said symbol clock input and having a second input equal to the number of samples per symbol, said clock means operating to produce first and second clock signals;
phase incrementing means connected to said register means and to said clock means, said phase incrementing means being operated in response to said first clock signal to produce a plurality of phase increment signals proportional to said symbols of said symbol input; and
phase accumulator means connected to said phase incrementing means and to said clock means, said phase accumulator means being operated in response to said second clock signal to sequentially add each of said plurality of phase increment signals to produce said phase state signal.

4,873,501
INTERNAL TRANSMISSION LINE FILTER ELEMENT

Alfred R. Hislop, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 27, 1986, Ser. No. 881,419
Int. Cl.[4] H01P 1/203, 1/207, 7/08
U.S. Cl. 333—204 15 Claims



1. A transmission line filter element for inclusion in a transmission line that propagates electromagnetic energy, said transmission line having a longitudinal axis comprising:
a strip of conductive material positioned within said transmission line said strip of conductive material comprising one of the conductors of said transmission line; and
means for rejecting the propagation of a band of frequencies of electromagnetic energy through said transmission line comprising a U-shaped gap positioned within said strip of conductive material, said U-shaped gap having first and second side legs that are gaps in said strip of conductive material and further having a bottom leg, positioned between said first and second side legs, said bottom leg being a gap in said strip of conductive material, said first and second side legs having first and second longitudinal axes, said first and second longitudinal axes being parallel to said longitudinal axis of said transmission line.

4,873,502
NEGATIVE IMMITTANCE CONVERTER

Jacob S. Visser, Hilversum, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 27, 1988, Ser. No. 263,654
Claims priority, application Netherlands, Oct. 29, 1987, 8702571
Int. Cl.[4] H03H 11/44
U.S. Cl. 333—216 12 Claims

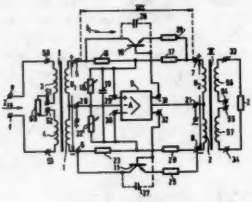
1. A negative immittance converter, comprising
a first transformer including a first coil having first and second terminals and a center tap,
a second transformer including a second coil having respective first and second terminals and a center tap,
first and second amplifier elements each having a respective control input, the first amplifier element being connected between the first terminal of the first coil and the first terminal of the second coil, and the second amplifier

element being connected between the second terminal of the first coil and the second terminal of the second coil,

respective power supply points connected to the respective center taps of the first and second coils, and

a 180° phase shifter connected between the first and second terminals of the second coil and the respective control inputs of said amplifier elements,

characterized in that said 180° phase shifter is formed by a voltage differential amplifier having two inputs, and



said converter comprises a first voltage divider connected between the respective first terminals of the first and second coils, having a terminal connected to one input of said voltage differential amplifier, and a second voltage divider connected between the respective second terminals of the first and second coils and having a respective voltage divider terminal connected to the other input of said voltage differential amplifier,

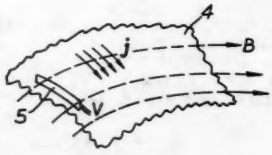
said control inputs of the first and second amplifier elements being respectively connected to respective outputs of the differential amplifier.

4,873,503

ELECTRICAL COILS

Peter Mansfield, and Barry L. W. Chapman, both of Beeston, England, assignors to National Research Development Corporation, London, England

Filed Jun. 24, 1987, Ser. No. 65,853
Int. Cl.[4] H01F 7/22
U.S. Cl. 335—216 **8 Claims**



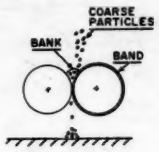
1. An electrical coil for generating a magnetic field comprises a set of electrical conductors and means for supplying the conductors of the set with electrical currents of magnitude such that the resultant current distribution in the set of conductors approximates to the induced surface current distribution in a conductive former positioned in the place of said set and in the presence of the required magnetic field.

4,873,504

BONDED HIGH ENERGY RARE EARTH PERMANENT MAGNETS

Walter S. Blume, Jr., Cincinnati, and Walter S. Blume, III, Amelia, both of Ohio, assignors to The Electrodyne Company, Inc., Ohio

Filed Feb. 25, 1987, Ser. No. 18,626
Int. Cl.[4] H01F 7/02
U.S. Cl. 335—303 **23 Claims**



1. A process for making bonded magnets of the rare earth type having unexpectedly high magnetic properties, comprising:

adding particles of rare earth type permanent magnet material to a workable non-magnetic binder until the particles are coated with and cohered in the binder as a workable mass; the average size of the particles of the starting magnet material being substantially larger than single domain size for said magnet material, less than about 15 weight % of the particles of said starting material being smaller than 44 microns in size;

thereafter working said mass under shearing forces of such intensity that the average size of the particles is substantially reduced by such working, thereby improving the magnetic properties of the particles,

progressively reducing the thickness of said mass during said working while simultaneously increasing its area to form an extended shape therefrom,

forming desired magnet shapes from said sheet, and

magnetizing said magnet shapes to form permanent magnets therefrom,

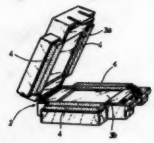
said magnets having a residual induction which exceeds by at least 5% the maximum value expected for their packing fraction.

4,873,505

ELECTRIC NOISE ABSORBER

Kazuhiro Matsui, Toyoake, Japan, assignor to Kitagawa Industries Co., Ltd., Aichi, Japan

Filed Apr. 11, 1988, Ser. No. 180,462
Claims priority, application Japan, May 29, 1987, 62-84514
Int. Cl.[4] H01F 17/06, 27/02, 27/26
U.S. Cl. 336—92 **13 Claims**



1. An electric noise absorber comprising:

a magnetic body abutably divided into two parts, each of said two parts having an abutment surface which has a recess and said magnetic body configured to enclose a portion of an electric conductor;

a retaining case including a pair of cases hingedly connected with each other for holding said magnetic body;

an auxiliary case connected to and adjacent a side of said retaining case, said auxiliary case including at least one cavity; and

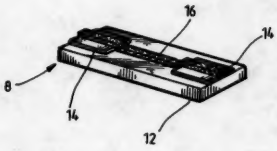
an elastic press member sized, shaped, and positioned to fit into a cavity of said auxiliary case and to engage and hold a conductor when said retaining case is in a closed condition about the conductor.

4,873,506

METALLO-ORGANIC FILM FRACTIONAL AMPERE FUSES AND METHOD OF MAKING

Leon Gurevich, St. Louis, Mo., assignor to Cooper Industries, Inc., Houston, Tex.

Filed Mar. 9, 1988, Ser. No. 166,082
Int. Cl.[4] H01H *35/04, 69/02*
U.S. Cl. 337—290 **14 Claims**



1. A method of making a fuse element subassembly comprising the steps of:

providing a support means of insulating material;

providing said support means with metallized areas so that said support means has a least two separate metallized areas; and

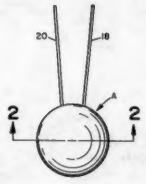
printing a metallo-organic ink on said support means and firing to provide a thin film fusible element on said support means to electrically connect said metallized areas.

4,873,507

ENCAPSULATED THERMAL PROTECTOR

Adamantios Antonas, Fairlawn, Ohio, assignor to Therm-O-Disc, Incorporated, Mansfield, Ohio

Filed Oct. 15, 1987, Ser. No. 108,757
Int. Cl.[4] H01C *7/10*
U.S. Cl. 338—22 R **15 Claims**



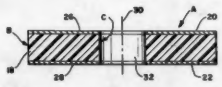
1. A thermal protector for electric circuits, said protector being characterized by increasing sharply in resistance when a normal operating temperature is exceeded, said protector having a normal operating temperature range and being capable of exploding under extreme overload conditions, said protector being encapsulated in inner and outer layers of substantially different materials having substantially different properties, said inner layer being of an energy-absorbing material that is capable of absorbing and dissipating energy released by explosion of said protector, and said outer layer being of an elastomeric material that is capable of substantial elastic expansion without rupturing when subjected to internal force from energy released by explosion of said protector.

4,873,508

VARIABLE RESISTANCE THERMAL PROTECTOR AND METHOD OF MAKING SAME

Bruce E. Ankenman, and Donald G. Cunitz, both of Mansfield, Ohio, assignors to Therm-O-Disc, Incorporated, Mansfield, Ohio

Filed Jun. 6, 1988, Ser. No. 202,946
Int. Cl.[4] H01C *3/04*
U.S. Cl. 338—25 **16 Claims**



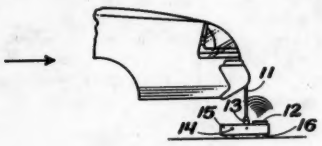
1. A PTC device having inner and outer peripheries and opposite surfaces, both said inner and outer peripheries intersecting both of said opposite surfaces, electrodes on said opposite surfaces for connecting said PTC device in a circuit to carry current therethrough between said electrodes, said PTC device having a conductive area between said inner and outer peripheries that is adjustable by varying the size of said inner periphery while maintaining the size of said outer periphery.

4,873,509

VEHICLE POSITION INDICATOR

David G. Simi, 3585 Waterfall Dr., Sparks, Nev. 89431

Filed Oct. 27, 1987, Ser. No. 113,019
Int. Cl.[4] B60Q *1/00*
U.S. Cl. 340—436 **1 Claim**



1. A vehicle position indicator apparatus to provide an audible signal upon a predetermined positioning of a vehicle with respect to said apparatus wherein said apparatus comprises,

a box-like case means including side walls, a top wall and a bottom wall, and

a contact antennae means secured within said case means and projecting vertically upwardly and outwardly of said top wall of said case a predetermined distance for engagement with said vehicle, and

a speaker means positioned in said case for emitting an audible sound upon said contact antennae completing an electrical circuit, and

switch means positioned proximate said antennae within said case to complete said circuit upon deflection of said antennae by said vehicle, and wherein an on/off switch means positioned through one of said side walls of said case

means enables selective completion of said circuit upon contact of said antennae with said switch means, and wherein a DC battery is positioned within said case means for providing energy to said electrical circuit, and

wherein said switch means comprises a 360 degree encircling ring about said antennae for enabling contact of said antennae with said switch means, and

wherein a rubber-like cover boot portion formed about said antennae means externally of said case means and in contact with said case means for containing sparking effected by completion of said circuit within said case means, and

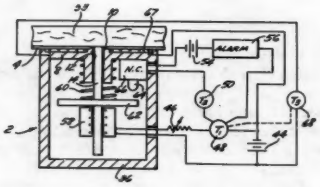
wherein friction-like feet are positioned downwardly from said bottom wall and externally of said case means to maintain said positioning of said apparatus on a horizontal support surface.

4,873,510

ICE DETECTOR WITH MOVABLE FEELER

Boris Khurgin, 175 W. 87th St., New York, N.Y. 10024

Filed Apr. 21, 1988, Ser. No. 184,361
Int. Cl.[4] G08B *19/02*
U.S. Cl. 340—580 **13 Claims**



1. An ice detector comprising a housing adapted to be mounted adjacent a location where the presence or absence of ice is to be detected, said housing having an aperture opening to said location, a feeler within said housing having a part movable through said aperture to a first position extending from said housing but normally in a second position retracted relative to said first position, driving means in said housing operatively connected to said feeler and active when actuated to urge said feeler to its first position, and detector means sensitive to the position of said feeler to indicate the presence or absence of ice at said location pursuant to whether said feeler is in its second or first position respectively after said driving means has been activated.

4,873,511

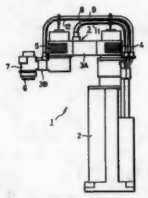
DEVICE FOR FORECASTING BREAKAGE CABLES IN AN INDUSTRIAL ROBOT

Seizo Tanaka, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 28, 1988, Ser. No. 187,146
Claims priority, application Japan, Apr. 28, 1987, 62-105022
Int. Cl.[4] G08B *21/00*; B25J *19/00*
U.S. Cl. 340—677 **11 Claims**

1. A device for forecasting breakage of cables coupled between a control means provided to a main body of an industrial robot and a driving means for driving arms of said industrial robot, said arms being driven by an instruction signal transmitted through said cables from said control means, the device comprising:

at least one sample wire for forecasting breakage of at least one of said cables, said at least one sample wire being disposed next to at least one of said cables, and becoming



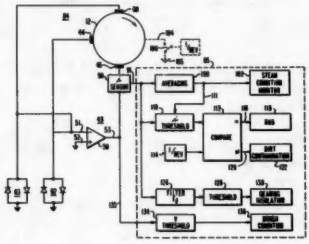
fatigued and breaking earlier than said cables to forecast the time of breakage of said cables.

4,873,512

ACTIVE SHAFT GROUNDING AND DIAGNOTIC SYSTEM

Robert C. Miller, Penn Hills, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 20, 1984, Ser. No. 591,636
Int. Cl.[4] G08B *21/00*
U.S. Cl. 340—679 **14 Claims**



1. An active shaft grounding system comprising:

(A) a rotating assembly having a shaft rotatable relative to a stationary assembly and subject to an electrical charge build-up during rotation;

(B) said shaft being electrically insulated from, and supported by, spaced-apart bearings;

(C) a first electrically conducting contact device contacting said shaft;

(D) a second electrically conducting contact device contacting said shaft;

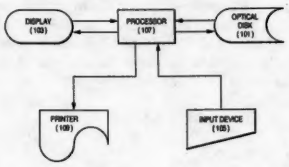
(E) feedback circuit means connected between said first and second contact devices and operable to provide a neutralizing current to said shaft, through said second contact device to inhibit said electrical charge build-up, as a function of the voltage at said first contact device; and

(F) protection means connected between said first contact device and ground potential and operable to limit the voltage of said first contact device to some predetermined maximum value.

4,873,513
AUTOMATED MAP DISPLAY SYSTEM

Donald J. Soults, Vienna, and Neil A. Daniels, Arlington, both of Va., assignors to Geodisplay Technology Limited Partnership, Vienna, Va.

Filed Aug. 26, 1987, Ser. No. 89,450
Int. Cl.[4] G09G *1/00*
U.S. Cl. 340—723 **13 Claims**



1. A map display system for electronically storing, accessing, and displaying video images generated from physical maps, the system comprising:

image storing means for storing images of the physical maps, each of said map images having corresponding field of view data representing the geographic coverage in longitude and latitude available as a displayed image derived after generating said map image from the corresponding physical map, a longitude value representing a reference longitude for the map image, and a latitude value representing a reference latitude for the map image;

means for displaying said map images:

means for selecting a latitude, longitude, and field-of-view data of a map image to be displayed, said selecting means including an input device for selectively positioning a locator on said displaying means and means for determining a latitude and longitude location from said position of said locator on said displaying means; and

means for accessing from said storing means and for transferring to said displaying means the unique stored map image including said latitude and longitude location and a field of view closest to said desired field of view data.

4,873,514
VIDEO DISPLAY SYSTEM FOR SCROLLING TEXT IN SELECTED PORTIONS OF A DISPLAY

Banri Nakagawa, Yamato, and Katsuyuki Nojima, Yokohama, both of Japan, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 17, 1985, Ser. No. 809,993
Claims priority, application Japan, Dec. 20, 1984, 59-267639
Int. Cl.[4] G09G *1/16*
U.S. Cl. 340—726 **6 Claims**

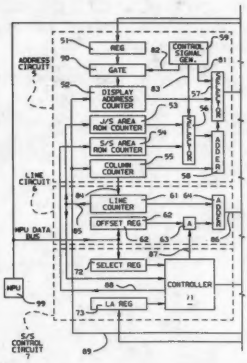
4. A video display system for smooth scrolling of a selected partition of a display device comprising, in combination,

a character generator operable to generate a horizontal slice of a character pattern on the display screen of a cathode ray tube in response to character and line count signals from a line counter which is synchronized with a raster scan of said cathode ray tube, the improvement characterized by

first means for storing control information to indicate a partition to be scrolled on said display screen, second means connected to said first means for generating a scroll area signal when said partition is scanned,

third means for retaining offset data,

fourth means connected to the output of said line counter, second and third means, and responsive to said scroll area signal for selectively modifying said line count signal with said offset data, and

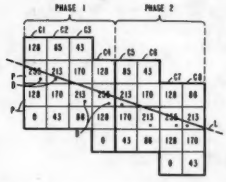


control means for changing said offset data in said third means.

4,873,515
COMPUTER GRAPHICS PIXEL PROCESSING SYSTEM

Calvin M. Dickson, Salt Lake City, and Kevin C. Rushforth, West Valley City, both of Utah, assignors to Evans & Sutherland Computer Corporation, Salt Lake City, Utah

Filed Oct. 16, 1987, Ser. No. 108,888
Int. Cl.[4] G09G *1/16*
U.S. Cl. 340—728 **13 Claims**



1. A computer graphics system for receiving display data, as in a form to specify a line in a display, said system for providing representative pixel data for said display and comprising:

a plotting unit for providing address data, as to specify a line in said display;

a plurality of parallel processors coupled to said plotting unit, said parallel processors being individually coupled for processing data for individual pixels of said display in stages, each stage treating an array of pixels in columns of a predetermined number of pixels, said columns being aligned individually substantially to said line to track said line, said processors providing display data for individual pixels in sequence and varying as the proximity of a pixel to a specified line; and

means for receiving and storing said display data in an arrangement for display.

4,873,516

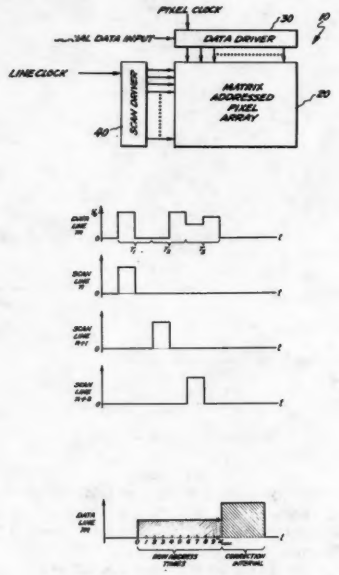
METHOD AND SYSTEM FOR ELIMINATING CROSS-TALK IN THIN FILM TRANSISTOR MATRIX ADDRESSED LIQUID CRYSTAL DISPLAYS

Donald E. Castleberry, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 56,512, Jun. 1, 1987, abandoned. This application Dec. 22, 1988, Ser. No. 287,670

Int. Cl.[4] G09G *3/36*

U.S. Cl. 340—784 9 Claims



1. A display device comprising:

a plurality of pixel electrodes disposed in a grid pattern on a first insulative substrate;

a plurality of semiconductor switching devices connected to, so as to be associated with, corresponding pixel electrodes;

a second substrate having disposed thereon at least one ground plane electrode, said second substrate being disposed adjacent to said first substrate at a predetermined distance therefrom;

liquid crystal material disposed between said substrates so that said pixel electrodes, said at least one ground plane electrode and said liquid crystal material form electrical devices having capacitive characteristics;

a plurality of electrically conductive scan lines, each said scan line being connected to a plurality of said semiconductor switching devices associated with a row of said pixel electrode grid;

a plurality of electrically conductive data lines, each said data line being connected to a plurality of said semiconductor switch devices associated with a column of said pixel electrode grid;

means for sequentially applying an enabling unipolar signal to said scan lines; and

means for applying a plurality of unipolar data signals to said data lines, said data signals being operative, in a period of time between initiation of successively activated scan line enabling signals, so that during a first portion of said tine period desired voltage levels are impressed on said data lines and during a second portion of said time period, corrective voltage levels are applied to said data lines so that in said time period, an approximately constant RMS voltage is applied to at least some of said data lines.

4,873,517

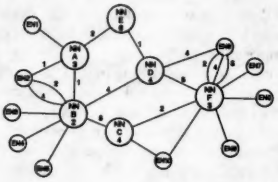
METHOD FOR SELECTING LEAST WEIGHT END NODE TO END NODE ROUTE IN A DATA COMMUNICATIONS NETWORK

Alan E. Baratz, Chappaqua, N.Y.; Kathryn E. Clarke, Little Silver, N.J.; Melinda R. Pollard, Raleigh, N.C.; Diane P. Pozefsky, Chapel Hill, N.C.; Lee M. Rafalow, Durham, N.C.; William E. Siddall, and James P. Gray, both of Chapel Hill, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 23, 1988, Ser. No. 210,273

Int. Cl.[4] H04Q *11/04;* H04L *11/20*

U.S. Cl. 340—825.030 6 Claims



1. A method of enabling a network node to determine an optimal route through a data communications network including end nodes and network nodes, said end nodes and network nodes being interconnected by transmission groups, said method including the steps of:

receiving from the end nodes information about the characteristics of transmission groups connecting the end nodes to network nodes;

calculating optimal routes from the end nodes to network nodes using received information;

calculating optimal routes between network nodes using information stored in a network topology database; and

combining the results of the above-defined calculating steps to determine the optimal end node-to-end node route.

4,873,518

PULSE WIDTH DISCRIMINATING CIRCUIT

Walter Mehnert, Ottobrunn, Fed. Rep. of Germany, assignor to MITEC Moderne Industrietechnik GmbH, Fed. Rep. of Germany

Filed Jul. 25, 1986, Ser. No. 890,042

Claims priority, application Fed. Rep. of Germany, Jul. 26, 1985, 3526839; Jul. 14, 1986, 3623705

Int. Cl.[4] H04Q *9/00*

U.S. Cl. 340—825.070 7 Claims

1. An addressable circuit arrangement, in particular for use in measuring and selecting units of a measuring arrangement, which measuring and selecting units are connected by means of a cable with each other and with a central unit comprising a transmitter from which signal pulses having different widths are transmitted to said measuring and selecting units, said addressable circuit arrangement comprising:

(a) an address memory for storing an address characterizing the addressable circuit arrangement,

(b) an address recognition circuit for comparing the stored address with addresses transmitted from said central unit in the form of signal pulses having a first width in time, and which, on agreement of a received address with the stored address, delivers a control signal, and

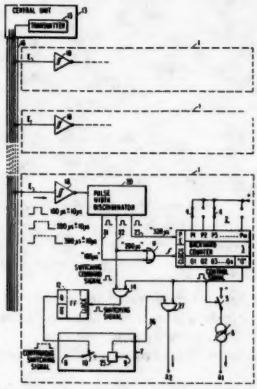
(c) a pulse width discriminating circuit for generating at least a first indication signal for each received signal pulse having a width greater than a first preselected lower limit

and less than a first preselected upper limit, said pulse width discriminating circuit comprising:

(1) a time measuring means responsive to said signal pulses and providing for each signal pulse at least a first lower limit signal when the width of said signal pulse exceeds that first lower limit and a first upper limit signal when the width of said signal pulse exceeds said first upper limit.

(2) a delay member delaying each signal pulse by a preselected period of time,

(3) at least a first digital latch circuit having a signal output and being set by said first lower limit signal from said time measuring means and being reset by the corresponding first upper limit signal from said time measuring means if said first upper limit signal occurs before



the trailing edge of the respective delayed signal pulse, and being reset by the trailing edge of the respective delayed signal pulse if said trailing edge occurs before said upper limit signal, and

(4) at least a first logic AND gate means having a first and a second input, said first input being connected to said signal output of said first digital latch circuit and said second input being supplied with a signal preventing said first logic AND gate means from generating an output signal as long as a signal pulse is present at the input of the pulse width discriminator,

whereby the output of said first logic AND gate means provides said first indication signal if said latch circuit is not reset by said first upper limit signal before the occurrence of the trailing edge of said undelayed signal pulse.

4,873,519

PAGING RECEIVER HAVING INDEPENDENT MEMORY AREAS FOR COMMON AND INDIVIDUAL ADDRESSES

Masahiro Matai; Takashi Ohyagi, and Toshihiro Mori, all of Tokyo, Japan, assignors to NEC Corporation, Japan

Division of Ser. No. 80,227, Jul. 28, 1987, Pat. No. 4,786,901, which is a continuation of Ser. No. 711,089, Mar. 12, 1985, abandoned. This application Mar. 28, 1988, Ser. No. 173,766

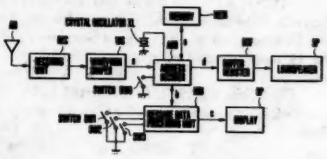
Claims priority, application Japan, Mar. 13, 1984, 59-46582

Int. Cl.[4] G08B 5/22; H04Q 7/00

U.S. Cl. 340—825.44 **6 Claims**

1. A paging receiver having an individual paging number and at least one common paging number, the common paging number being received more frequently than said individual paging number is received, said receiver comprising:

memory means including individual memory areas for storing at least one message signal following said individual paging number, and specific memory areas for storing message signals following said common paging number, the message signals stored in said individual memory areas



being not erased responsive to the receipt of the message signals following said common paging number.

4,873,520

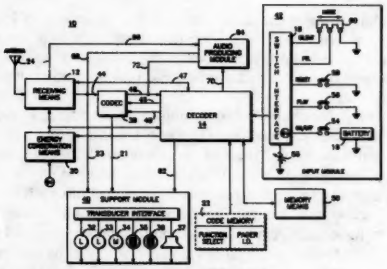
PAGING RECEIVER FOR STORING DIGITIZED VOICE MESSAGES

Kenneth D. Fisch, Delray Beach; Alfred R. Lucas, Coral Springs, and David F. Willard, Plantation, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 2, 1987, Ser. No. 115,029

Int. Cl.[4] H04Q 7/00

U.S. Cl. 340—825.44 **7 Claims**



1. A paging receiver comprising:

receiving means for receiving selective call signals intended for said paging receiver, wherein the selective call signals include at least one analog voice message for said paging receiver;

decoding means responsive to said selective call signals for enabling said paging receiver to recover said analog voice message;

conversion means responsive to said receiving means and said decoding means for converting said analog voice message to digital signals representative of a replica of the analog voice message;

memory means including at least one fixed capacity storage area for storing digital signals;

means for sensing the end of the recovered analog voice message and generating an end of message signal in response thereto;

signal producing means for generating predetermined digital signals;

control means for accessing said memory means to store in a portion of a selected fixed capacity storage area thereof the converted digital signals of said analog voice message during the conversion thereof by said conversion means and, governed by said end of message signal, to access said memory means to store in the remaining portion of said selected fixed capacity storage area the predetermined digital signals during the generation thereof; and

means for inhibiting memory accessing by said control means when the remaining portion of said selected fixed capacity area is filled.

4,873,521

ADDRESS ADMINISTRATION UNIT OF A MULTI-PROCESSOR CENTRAL CONTROL UNIT OF A COMMUNICATIONS SWITCHING SYSTEM

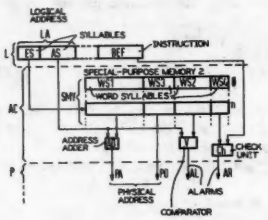
Klaus Dietrich, Sauerlach; Hans Hauer, Munich, and Klaus Schreier, Penzberg, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 25, 1987, Ser. No. 101,184

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1986, 3632608

Int. Cl.[4] H04Q *3/00*

U.S. Cl. 340—825.52 **6 Claims**



1. An address management unit for the conversion of logical addresses with two address portions contained in a program and composed of a first number of digits into physical address composed of any second, namely said first or another, number of digits comprising:

a computer-controlled communications switching system including physical objects, namely a multiprocessor central control unit having, a central bulk storage, and a plurality of additional memories as local memories in a plurality of central processors, a central bus system connecting said central processors to said bulk storage for collaboration between said central processors and said bulk storage, and a plurality of peripheral units connected to at least one input/output interface which is connected to said central bus system;

a special-purpose memory for storing long words containing at least four words address parts stored under a first of said two address portions, the long word length being of a number of digits;

an address adder and a comparator in at least one central processor, said processor converting logical addresses into physical addresses of memory locations in one of said additional memories and into the physical addresses of said peripheral units;

said four words address parts each corresponding to a defined control signal in which the first word address part comprises a number of digits and corresponds to a physical starting address of a physical address space in one of said memories, a second word address part comprises a number of digits and corresponds to the respectively highest physical address of the plurality of physically-existing addresses of the physical address space to be selected, a third word address part corresponding to the physical object to be respectively selected, and a fourth word address part which corresponds to information concerning access rights,

said address adder operable to add a second of said two address portions and said first word address part, said comparator operable to compare said second address portion to said second word address part, and

a check unit in at least said one central processor for receiving said fourth word address part for monitoring the access to a selected object selected according to said third word address part.

4,873,522

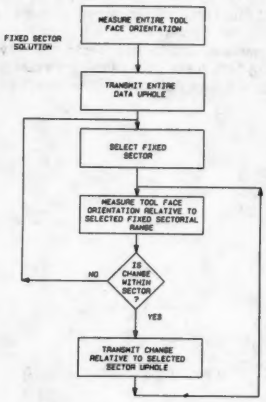
METHOD FOR TRANSMITTING DOWNHOLE DATA IN A REDUCED TIME

Rainer Jürgens, Celle, Fed. Rep. of Germany, assignor to Eastman Christensen Company, Salt Lake City, Utah

Filed May 4, 1987, Ser. No. 46,136

Int. Cl.[4] G01V *1/00*

U.S. Cl. 340—853 **18 Claims**


MEASURE ENTIRE TOOL FACE ORIENTATION
FIXED SECTOR SOLUTION
TRANSMIT ENTIRE DATA UPHOLE
SELECT FIXED SECTOR
MEASURE TOOL FACE ORIENTATION RELATIVE TO SELECTED FIXED SECTORIAL RANGE
IS CHANGE WITHIN SECTOR ?
NO
YES
TRANSMIT CHANGE RELATIVE TO SELECTED SECTOR UPHOLE

1. A method for reducing transmission time of a parameter value of downhole data from a downhole location to a remote location of a well bore comprising:

(a) defining a value of said parameter in said well bore a first time;

(b) representing said value as a range of values and a position within said range;

(c) transmitting said value representation from said downhole location to said remote location at a fixed rate;

(d) storing said range representation at both said downhole and remote locations;

(e) measuring a value of said parameter in said well bore;

(f) determining if said measured value falls within the stored range; and

(g) (1) if yes, transmitting only said position within said stored range of said measured value from said downhole location to said remote location at a fixed rate; or

(2) if no, selecting a new range and representing said measured value as said new range and a position therewithin and transmitting said new range and position within range from said downhole location to said remote location at a fixed rate and thereafter storing said new range at both locations in lieu of the previously-stored range and (i) repeating steps (e), (f) and (g).

4,873,523

SHALLOW WATER INDICATOR FOR A BOAT

Harry E. Jones, 9408 NE. 188th St., Bothell, Wash. 98011

Filed Oct. 8, 1987, Ser. No. 106,723

Int. Cl.[4] G08B *23/00*

U.S. Cl. 340—984 **16 Claims**

1. A shallow water detector for a boat, comprising:

a source of electrical energy;

a signal device;

a main housing positionable on a boat;

a normally off snap-action microswitch in said main housing, including a switch housing and a depressible operator projecting outwardly from the switch housing which when depressed turns the switch on;

electrical conductor means connecting the source of electrical energy, the signal device and the microswitch together

such that when the microswitch is on the source of electrical energy is connected to the signal device and the signal device is on;

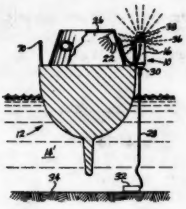
a switch actuator member having an end portion directed towards the depressible operator;

guide means in said main housing for guiding the actuator member for linear reciprocating movement towards and away from said depressible operator;

spring means biasing the actuator member towards and into depressing contact with the depressible operator;

line means for suspending a weight, said line means having a first end connectable to the actuator member and a second end which in use extends from the boat into the water;

a weight connected to the second end of said line means and when suspended exerting a pulling force on the actuator member in opposition to the spring force, and said weight being of sufficient mass when suspended to overcome the force of the spring means and hold the actuator member away from depressing contact with the depressible operator;



said line means being of a predetermined length indicative of a safe depth condition for the boat so long as the weight is suspended; and

said spring means functioning in response to bottom contact by said weight of a type and amount sufficient to produce slack in the line means, to move the actuator member into contact with the depressible operator of the microswitch, to depress said operator and operate the microswitch to connect the source of electrical energy to the signal device, causing operation of the signal device to signal a shallow water condition;

wherein said guide means is a tubular housing and said end portion of said switch actuator member is sized to slidably reciprocate within said tubular housing towards and away from the depressible operator.

4,873,524

DECODING UNIT FOR CMI-ENCODED SIGNALS

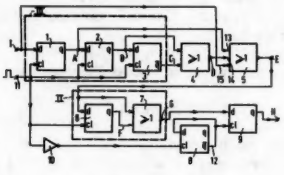
Gerardus P. M. Akkermans, Hilversum, Netherlands, assignor to AT&T and Philips AT&T Philips Telecommunications B.V., Hilversum, Netherlands

Filed Mar. 18, 1988, Ser. No. 169,679

Claims priority, application Netherlands, Mar. 27, 1987, 8700720

Int. Cl.[4] H03M *5/14*

U.S. Cl. 341—73 **5 Claims**



1. A decoding unit for CMI-encoded input signals having an input and an output, the input of the decoding unit being coupled via a time delay stage to a first input of a first gate circuit a second input of which is connected to the input of the decoding unit, the output of the gate circuit being coupled to the output of the decoding unit, characterized in that the time delay stage comprises a series arrangement of first, second and third delay elements, that the first input of the first gate circuit is connected to the output of a second gate circuit an input of which is conneted to the output of the third delay element and another input of which is connected to the output of the second delay element, and that a third input of the first gate circuit is connected to the output of the first delay element.

4,873,525

COMPACT R SEGMENT D/A CONVERTER

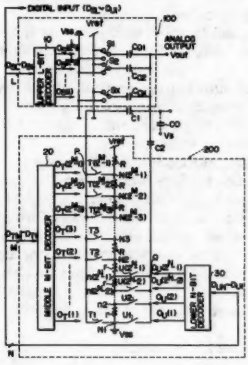
Tetsuya Iida, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 8, 1988, Ser. No. 165,702

Claims priority, application Japan, Mar. 13, 1987, 62-58128

Int. Cl.[4] H03M *1/68*

U.S. Cl. 341—145 **11 Claims**



1. A digital-to-analog converter comprising:

a group of resistors serially connected between a power source potential supply terminal and a reference potential supply terminal;

a first group of switches, connected between a first circuit point and a predetermined serial connection node on said resistor group and between the first circuit point and said reference potential supply terminal, and controlled so that one of them is selectively turned on according to upper bits of a digital signal;

a second group of switches, connected between a second circuit point and a predetermined serial connection node on said resistor group and between the second circuit point and said reference potential supply terminal, and controlled so that one of them is selectively turned on according to lower bits of the digital signal; and

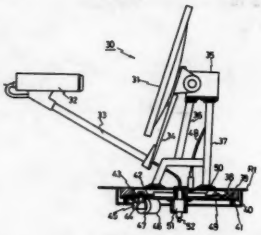
first and second capacitors connected between an output terminal and said first circuit point, and between the output terminal and said second circuit point, respectively.

4,873,526

MOBILE STATION ANTENNA ATTITUDE CONTROL APPARATUS

Suzuki Katsuo, Tokyo, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Aichi and Kabushiki Kaisha Shinsangyokaihatsu, Tokyo, both of, Japan

Filed Jul. 7, 1988, Ser. No. 217,524
Claims priority, application Japan, Jul. 8, 1987, 62-170623
Int. Cl.[4] H01Q 3/00
U.S. Cl. 342—359 4 Claims



1. A mobile station antenna attitude control apparatus comprising:

an antenna attitude changeably supported on a mobile station;

a drive mechanism for changing attitude of an antenna at a plurality of different speeds;

a receiving level detecting means for detecting receiving level of an antenna;

a first drive information setting means for renewing and setting first drive information for changing attitude of antenna in a direction resulting in an increase of receiving level by monitoring the receiving level detected by the receiving level detecting means;

an attitude detecting means for detecting attitude information of a mobile station;

a second drive information setting means for renewing and setting second drive information to correct relative change of attitude of an antenna due to attitude change of mobile station based on the attitude information of mobile station detected by said attitude detecting means;

a drive information correcting means for correcting said second drive information depending on change on time of the second drive information set by the second drive information setting means by monitoring such change thereof; and

a control means for controlling said drive mechanism based on the first drive information set by said first drive information setting means and the second drive information corrected by said drive information correcting means;

wherein said drive information correcting means corrects said second drive information to that providing a higher speed drive when change of time of the second drive information set by said second drive information setting means is larger than the specified value.

4,873,527

ANTENNA SYSTEM FOR A WRIST CARRIED PAGING RECEIVER

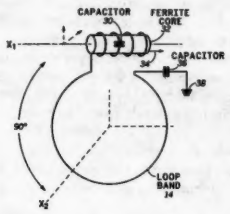
William Tan, Lantana, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 7, 1988, Ser. No. 141,455
Int. Cl.[4] H01Q 7/08
U.S. Cl. 343—718 8 Claims

1. An antenna system for a wrist carried paging receiver comprising:

a single magnetic loop antenna having first and second ends, said loop antenna enclosed in a non-conductive housing surrounding the wrist, said single magnetic loop antenna having the first end grounded;

a ferrite core loop antenna connected in series to the second end of said magnetic loop antenna, said ferrite core loop antenna having an output applied as an input to a receiving means of the paging receiving selective call signals; and



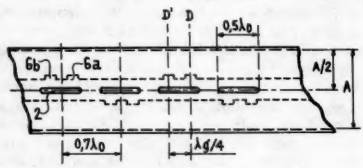
further wherein, an axis of the single magnetic loop antenna is perpendicular to and non-coplanar with the ferrite core loop axis.

4,873,528

DEVICE FOR ENERGIZING A NON-ECCENTRIC IN THE WIDE SIDE OF A WAVEGUIDE, AND A SLOTTED ANTENNA COMPRISING SUCH A DEVICE

Bernard Girard, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Mar. 2, 1983, Ser. No. 472,259
Claims priority, application France, Mar. 26, 1982, 82 05248
Int. Cl.[4] H01Q 13/10
U.S. Cl. 343—770 6 Claims



1. A device for energizing an antenna formed by a rectangular waveguide comprising a first wide side pierced by at least one slot extending along a longitudinal axis of symmetry and a second wide side provided with a ridge bearing a metallic ribbon parallel to the wide sides of the guide and extending along the middle of the second wide side, said ribbon providing for each slot first and second thin metallic teeth of identical shape symmetrical with respect to an axis of symmetry of the two teeth to energize a parallel extending slot with the teeth being arranged side by side on the edge of the metallic ribbon.

4,873,529

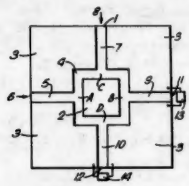
COPLANAR PATCH ANTENNA

Peter J. Gibson, Crawley, England, assignor to U.S. Philips Corp., New York, N.Y.

Filed Dec. 16, 1988, Ser. No. 286,572
Claims priority, application United Kingdom, Dec. 22, 1987, 8729876
Int. Cl.[4] H01Q 1/38
U.S. Cl. 343—700 MS 8 Claims

1. A coplanar patch antenna including a continuous layer of a dielectric material, a patch of conductive material supported on a major surface of the layer of dielectric material, a ground plane of conductive material supported on said major surface

of the layer of dielectric material and substantially surrounding and spaced from the patch of conductive material, and means for feeding electrical signals to the antenna, characterised in



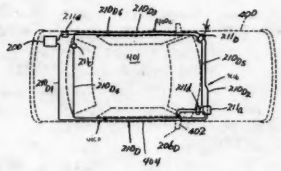
that the means for feeding electrical signals to the antenna comprises a slot line formed in said ground plane of conductive material and opening into the space between the ground plane and the patch of conductive material.

4,873,530

ANTENNA DEVICE IN AUTOMOTIVE KEYLESS ENTRY SYSTEM

Mikio Takeuchi; Kinichiro Nakano, both of Zama; Kenichi Mitamura, Fujisawa, and Takahisa Tomoda, Sagamihara, all of Japan, assignors to Nissan Motor Co., Ltd., Yokahama, Japan

Filed Sep. 29, 1986, Ser. No. 912,518
Claims priority, application Japan, Sep. 30, 1985, 60-214866
Int. Cl.[4] H01Q *1/32*
U.S. Cl. 343—711 **15 Claims**



1. An antenna device for an automotive keyless entry system comprising:

a lock device mounted on a vehicle and operable between a first locking position and a second unlocking position, and said lock device including an actuator operating said lock device between said first and second positions in response to a control signal;

a pocket-portable transmitter producing a radio signal containing a unique code identifying the transmitter, said transmitter having a first loop antenna;

a controller receiving said radio signal and comparing said unique code contained in said radio signal with a preset code therein, and producing said control signal when said unique code matches said preset code said controller operatively connected to provide said control signal to said actuator;

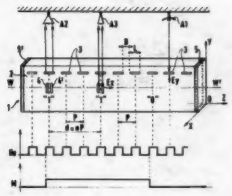
a second antenna connected to said controller and surrounding a vehicle compartment.

4,873,531

IDENTIFICATION TRANSPONDER FOR USE WHEN A VEHICLE PASSES A GIVEN POINT

Marc Heddebaut, Sainghin En Melantois; Pierre Mainardi, Douvrin; Pierre Degauque, Lambersart, and Denis Duhot, Paris, all of France, assignors to Societe Anonyme dite : Alsthom, Paris, France

Filed Nov. 16, 1988, Ser. No. 271,814
Claims priority, application France, Nov. 20, 1987, 87 16092
Int. Cl.[4] H01Q *13/10*
U.S. Cl. 343—711 **8 Claims**



1. An identification transponder for use when a vehicle passes a given point, the transponder being constituted by a rectangular waveguide having a large face along a waveguide axis WW', said large face including regularly spaced-apart longitudinal slots along one of its longitudinal edges and having longitudinal axes extending substantially parallel to said waveguide axis and slot pairs, each slot pair constituted by two slots having axes extending perpendicularly to said waveguide axis and centered on said waveguide axis, each of said pairs being adjacent a longitudinal slot, with the pairs being disposed along said waveguide axis at a pitch of one pair for every n longitudinal slots, and with the presence of a pair corresponding to a bit of value 1 and the absence of the pair corresponding to a bit of value 0, the longitudinal slots successively receiving radiation of polarization Ey perpendicular to said waveguide axis, said radiation including a low frequency F1 and a high frequency F2, the longitudinal slots re-emitting radiation of polarization Ey at said high frequency F2, and said pairs re-emitting radiation of polarization Ez parallel to said waveguide axis at said low frequency F1, said transponder being a passive transponder having no power supply.

4,873,532

ANTENNA APPARATUS FOR A VEHICLE

Kaoru Sakurai, Kanagawa; Harunori Murakami, Tokyo; Hikaru Mizukami, and Kazuhisa Fujita, both of Kanagawa, all of Japan, assignors to Nippon Sheet Glass Co., Ltd., Japan

Filed Sep. 29, 1988, Ser. No. 251,347
Claims priority, application Japan, Oct. 7, 1987, 62-153644[U]
Int. Cl.[4] H01Q *1/38*
U.S. Cl. 343—713 **8 Claims**

1. An antenna apparatus for a vehicle, comprising:

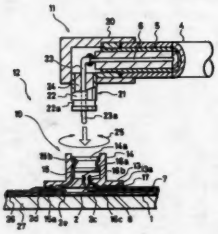
first and second layers of transparent insulating film, said first layer having adhesive applied to its outside surface to attach the film to a vehicle window;

an antenna element conductor interposed between said first and second film layer and comprising a feeder terminal conductor and a ground terminal conductor, said second film layer having an opening therein to expose said feeder terminal conductor and said ground terminal conductor;

a pair of detachably coupled coaxial connectors comprising a plug member and a receptacle member and engaging means for preventing the connectors from being easily disconnected, said coaxial connectors further comprising an inner contact and an outer contact to which said feeder terminal conductor and ground terminal conductor are respectively connected, one of said connectors being

mounted on said second film layer with its plug-in axis perpendicular to the surface of the film; and

a coaxial feeder cable attached to the other of said coaxial connectors so as to extend perpendicularly to the plug-in axis of said coaxial connectors,



said antenna element conductor being subjected to unbalanced power feed with a communication apparatus through said coaxial feeder cable.

4,873,533

MARKER FOR LOCATING A BURIED OBJECT

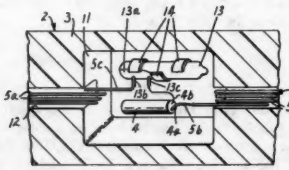
Tomoyasu Oike, Sagamihara, Japan, assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 9, 1987, Ser. No. 106,343

Claims priority, application Japan, Nov. 18, 1986, 61-176955[U]

Int. Cl.[4] H01Q *1/04, 1/40*

U.S. Cl. 343—744 **5 Claims**



1. A marker for positioning in proximity to a buried object, the marker being detected to locate the buried object by use of the fact that an antenna of the passive resonance type having a coil and capacitor connected in a closed series circuit for operation, which forms a part of the marker, is resonantly responsive to an electromagnetic wave of a specified frequency transmitted to the marker, the marker including means forming a part of the series circuit for opening the series circuit in response to a change, such as inclination and displacement, of the marker from its initial position of installation thereby preventing the occurrence of any resonant response by the marker to an electromagnetic wave transmitted subsequent to the occurrence of such change, said means including a switch which is position sensitive for presenting an electrical open or closure, said switch presenting an electrical open in response to the inclination of the marker from its initial position of installation.

4,873,534

HYBRID MODE FEED HORN HAVING FUNNEL-SHAPED HORN FLANGE WITH GROOVED CONICAL INNER SURFACE

Rudolf Wohlleben, Am Bogen 9, 5300 Bonn 1 (Röttgen), and Johann Mutschlechner, Frankenstr. 31, 5357 Odendorf, both of Fed. Rep. of Germany

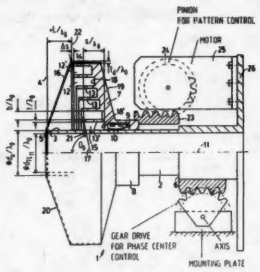
PCT No. PCT/EP86/00661, § 371 Date Jul. 20, 1987, § 102(e) Date Jul. 20, 1987, PCT Pub. No. WO87/03143, PCT Pub. Date May 21, 1987

PCT Filed Nov. 17, 1986, Ser. No. 90,586

Claims priority, application Fed. Rep. of Germany, Nov. 18, 1985, 3540900

Int. Cl.[4] H01Q *13/06*

U.S. Cl. 343—786 **13 Claims**



1. A feed horn for use as a primary focus feed of a reflector antenna, the feed horn having a horn flange located at a free end portion of a tubular TE_{11}-mode feeding waveguide, the horn flange widening in a funnel shape radially outwardly from a horn throat fitted on the feeding waveguide and which horn flange has a conical inner surface which is provided with grooves therein of uniform axial depth extending parallel to and coaxially with a central longitudinal axis of the feeding waveguide, the grooves being radially separated by concentric ring-shaped walls therebetween, the walls extending parallel to said central longitudinal axis, characterized in that a half opening angle $\theta°$ of the horn flange (7) defined between the central longitudinal axis (11) of the feeding waveguide (2) and the inner surface of the horn flange lies in the region $70° < \theta° < 80°$ and in that a free end of the feeding waveguide (2) is protrudingly offset axially relative to the intersection between a straight line connecting free axial ends of said walls separating the grooves in the horn flange inner surface and the feeding waveguide, means being provided on the free end portion of the feeding waveguide and on the feed horn for axially shifting the feed horn on the free end portion of the feeding waveguide for adjusting said offset.

4,873,535

METHOD OF DRIVING THERMAL HEAD

Eiichi Sasaki, Sagamihara, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed May 20, 1988, Ser. No. 196,428

Claims priority, application Japan, May 25, 1987, 62-127438

Int. Cl.[4] G01D *15/10*

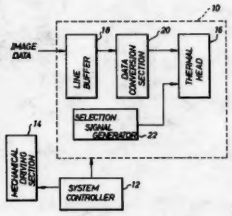
U.S. Cl. 346—1.1 **3 Claims**

1. A method of driving a thermal head in a printing device, said thermal head having a plurality of thermal resistance elements arranged in one line, each of said thermal resistance elements capable of being energized by heating pulses the number of which is controlled in accordance with the required density of a corresponding picture element, said method comprising the steps of:

electrically and alternately separating said thermal resistance

elements into first blocks and second blocks so that the odd arranged elements and the even arranged elements of said plurality of thermal resistance elements are separated into said first blocks and second blocks, respectively;

simultaneously applying a heating pulse to all the necessary thermal resistance elements separated in the first block;



simultaneously applying a heating pulse to all the necessary thermal resistance elements separated in the second block; and

alternately repeating said two applying steps in sequence until the respective numbers of the heating pulses are applied to each of the thermal resistance elements so as to obtain the required density.

4,873,536

METHOD AND APPARATUS FOR PREVENTING UNEVENNESS IN PRINTING DEPTH IN A THERMAL PRINTER

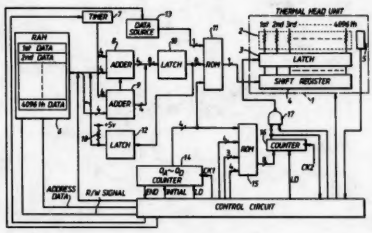
Takehiko Minowa, and Toshifumi Yamamoto, both of Hino, Japan, assignors to Kabushiki Kaisha Toshiba, Japan

Filed Dec. 22, 1987, Ser. No. 136,395

Claims priority, application Japan, Dec. 26, 1986, 61-313064

Int. Cl.[4] G01D *9/00, 15/10*

U.S. Cl. 346—76 PH **37 Claims**



1. In thermal printing apparatus having a thermal printing head with a line of heat generating elements, a printing method comprising the steps of:

(a) providing a line of original print data;

(b) determining an elapsed time interval for each element since that element last received driving current;

(c) determining a print period for each element in response to the original print data and a corresponding non-print period dependent upon the determined elapsed time interval; and

(d) driving each element to print by the respective determined print period.

18. Thermal printing apparatus having a thermal printing head with a line of heat generating elements, said elements being adapted to print by receiving driving current, said thermal printing apparatus comprising:

data providing means for providing a line of original print data corresponding to a line L_n to be printed wherein each line of data comprises a plurality of data bits each data bit corresponding to a respective heat generating element;

print period means for determining a non-print period for each element wherein the non-print period represents the elapsed time interval since that element last received driving current, said print period means for determining print period for each element in response to that element's respective non-print period and print data bit; and

drive means for supplying driving current to each said heat generating element in response to the determined print period for said heat generating element.

4,873,537

IMAGE RECORDING APPARATUS FOR PRODUCING A PLURALITY OF PULSE WIDTH MODULATED SIGNALS ON THE BASIS OF IMAGE DATA

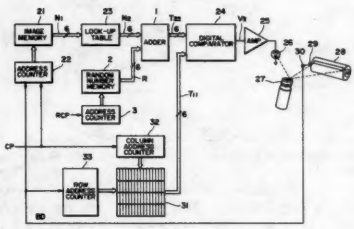
Shinichi Ohta, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 225,644, Jul. 27, 1988, abandoned, which is a continuation of Ser. No. 870,421, Jun. 4, 1986, abandoned. This application Mar. 20, 1989, Ser. No. 325,030

Claims priority, application Japan, Jun. 8, 1985, 60-123520; Jun. 8, 1985, 60-123521; Jun. 8, 1985, 60-123522; Oct. 30, 1985, 60-245231

Int. Cl.[4] G01D *9/42*

U.S. Cl. 346—108 **24 Claims**



1. An image recording apparatus comprising:

image data input means;

forming means for forming a plurality of pulse width modulated signals having the same number of pulses but different pulse widths, in a unit region, so as to reproduce a variable density image on the basis of a density level of image data input by said input means; and

scanning means for scanning a beam modulated in accordance with the pulse width modulated signals output from said forming means and recording an image on a recording medium;

wherein said scanning means effects a scanning operation thereof so that said beam modulated by said pulse width modulated signals forms spots overlapping each other.

4,873,538

PEN SHUTTLE GUIDE AND SPRING RETURN

Robert H. Niemeyer, III, Beaverton, Oreg., assignor to AM International Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 75,533, Jul. 20, 1987, Pat. No. 4,763,140. This application Jun. 16, 1988, Ser. No. 207,216

Int. Cl.[4] G01D *9/30, 15/16*

U.S. Cl. 346—139 R **19 Claims**

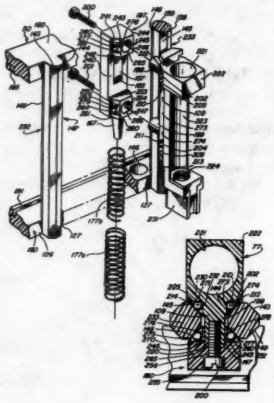
10. For use in a graphic recorder in which a pen carriage is moveably supported upon a pen carriage path, pen shuttle guide means comprising:

a pen carriage having a front side and a rear side and a plurality of vertical slots extending therebetween arranged in a linear array and having front pairs of inwardly angled planar front guide surfaces on said front side adjacent each of said slots and extending substantially the

lengths thereof and having rear pairs of inwardly angled planar rear guide surfaces on said rear side adjacent each of said slots and extending substantially the lengths thereof;

a plurality of pen shuttles each configured to receive and support a recording pen and defining an elongated member having first bearing means positioned to contact said front guide surfaces when said pen shuttle is received within one of said vertical slots from said front side;

a plurality of pen shuttle backs each defining an elongated member having second bearing means positioned to



contact said rear guide surfaces when said pen shuttle back is received within one of said vertical slots from said rear side;

a plurality of attachment means securing each of said pen shuttles to respective ones of said pen shuttle backs to form a plurality of pen assemblies in which each of said pen shuttles is secured to one of said pen shuttle backs and slideably captivated against said front and rear guide surfaces respectively and moveable between a raised position and a lowered position; and

return spring means biasing said pen assemblies to their uppermost positions within said vertical slots.

4,873,539

PHASE CHANGE INK JET APPARATUS

Thomas W. DeYoung, Stormville, N.Y., assignor to Dataproducts Corporation, Woodland Hills, Calif.

Continuation of Ser. No. 913,547, Sep. 26, 1986, abandoned, which is a continuation of Ser. No. 661,924, Oct. 16, 1984, abandoned. This application Jul. 26, 1988, Ser. No. 224,260

The portion of the term of this patent subsequent to Aug. 19, 2003, has been disclaimed.

Int. Cl.[4] G01D *15/16*

U.S. Cl. 346—140 R **18 Claims**

1. Hot-melt ink jet printing apparatus for ejecting droplets of phase change ink comprising:

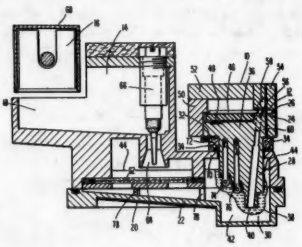
an imaging head having at least one ink jet including a chamber, an orifice and an inlet;

a reservoir containing a supply of the phase change ink, said reservoir coupled to the inlet of said at least one ink jet;

first heater means for heating ink in said jet so as to undergo a phase change from a solid state to a liquid state without degrading the ink;

second heater means for heating ink in said reservoir so as to undergo a phase change from a solid state to a liquid state without degrading the ink;

thermal resistance barrier means between said imaging head and said reservoir, whereby said first heater means is adapted to be controlled independently of said second heater means, thereby enabling said imaging head to be maintained at a different temperature than said reservoir;



said jet comprising a material having a thermal conductivity of at least 0.03 g cal/sec cm^2 (°C./cm).

4,873,540

IMAGE RECORDING METHOD

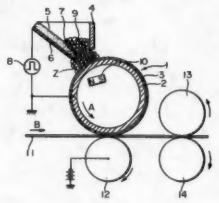
Masumi Asanae, Kumagaya, and Kimura Fumio, Isezaki, both of Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 182,116, Apr. 15, 1988, abandoned. This application Jun. 3, 1988, Ser. No. 202,591

Claims priority, application Japan, Apr. 15, 1987, 62-92327

Int. Cl.[4] G01D *15/00*

U.S. Cl. 346—160.1 **4 Claims**



1. A method of forming an image comprising the steps of:

(a) arranging a plurality of recording electrodes opposite to a movable recording member having an insulating layer on the surface, thereby forming a recording area between said insulating layer and said recording electrodes;

(b) supplying to said recording area magnetic toner, said supplying step including the step of selecting magnetic toner consisting of toner particles composed of a binder resin and magnetic powder, said toner particles being coated with particles made of a conductive material and further coated thereon with particles made of an insulating material so that it has a bulk resistivity of $10^6\Omega$.cm or less and a resistivity of 10^5–$10^{15}\Omega$.cm; and

(c) applying signal voltage corresponding to said image to said recording electrodes, thereby forming a toner image on the surface of said recording member.

4,873,541

IMAGE FORMING APPARATUS

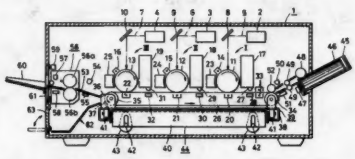
Yoshihiko Hirose; Tomohiro Aoki, both of Yokohama; Kazuyoshi Chiku; Yasushi Murayama, both of Tokyo; Takashi Uchida, Yokohama; Kunihiko Matsuzawa, Kawasaki, and Kazunori Kanekura, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 198,736, May 25, 1988, abandoned. This application Feb. 21, 1989, Ser. No. 313,362

Claims priority, application Japan, May 28, 1987, 62-132915; Aug. 6, 1987, 62-196581; Aug. 6, 1987, 62-196582

Int. Cl.[4] G01D *15/00*

U.S. Cl. 346—160.1 37 Claims



1. An image forming apparatus comprising:

image forming means including movable image carrying means for forming an image corresponding to image information on said image carrying means;

transfer means for transferring the image carried by said image carrying means to an image receiving member;

feeding means defining a closed path for feeding said image receiving member to a position for the transfer of the image from said image carrying means;

moving means for moving said feeding means between a first position where said feeding means is operable with said image carrying means and a second position where said feeding means is not operable with said image carrying means;

cleaning means for cleaning said feeding means; and

control means for operating said feeding means so that said feeding means is cleaned by said cleaning means when said feeding means is in said second position.

4,873,542

AUTO-FOCUS CAMERA

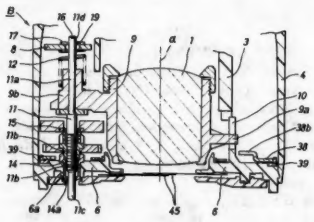
Haruki Nakayama, Hachioji, Japan, assignor to Konica Corporation, Tokyo, Japan

Filed Sep. 1, 1988, Ser. No. 239,369

Claims priority, application Japan, Sep. 4, 1987, 62-221349; Sep. 4, 1987, 62-221350

Int. Cl.[4] G03B *3/00*

U.S. Cl. 354—400 7 Claims



1. An auto-focus camera for moving a focusing lens along a lens optical axis upon rotation of a focus control motor, comprising:

a focusing lens supporting feed screw rod supported substantially parallel to the lens optical axis and having focusing means at its one end; and

a spacer nut meshed with a feed screw portion of said feed screw rod, so that longitudinal movement thereof is prevented, and rotated by said focus control motor.

4,873,543

AUTOMATIC FOCUSING CAMERA

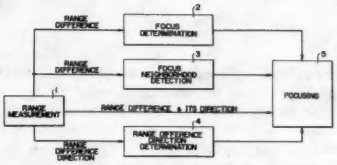
Minoru Matsuzaki; Junichi Itoh, both of Hachioji, and Youji Watanabe, Sagamihara, all of Japan, assignors to Olympus Optical Co., Ltd., Japan

Filed Oct. 8, 1987, Ser. No. 106,574

Claims priority, application Japan, Nov. 1, 1986, 61-261692

Int. Cl.[4] G03B *3/10*

U.S. Cl. 354—402 20 Claims



1. An automatic focusing camera including measuring means for detecting an amount and a direction of difference between an image forming position of light from an object being photographed and a film surface to drive a taking lens in response to an output therefrom and focus determining means for determining an in-focus condition when an amount of the difference measured by said measuring means is less than a given value to produce an in-focus signal to complete a focusing operation, comprising:

means for detecting the neighborhood of focus for comparing said amount of difference with a standard value larger than said given value;

means for determining a direction of difference for comparing a direction of difference last measured by said measuring means with that presently measured after the taking lens has been driven in response to the last measured output; and

means for adjusting focusing for driving the taking lens in response to a measured output from said measuring means such that when said focus neighborhood detecting means detects that said amount of difference is less than said standard value and said direction detecting means detects that the last and the presently measured directions are the same, the focusing operation is completed with the next lens driving and when said amount of difference is less than said standard value and both said directions are different from each other, a range measurement resumes after the next lens driving is carried out.

4,873,544

PHOTOGRAPHIC CAMERA HAVING A PIEZO-ELECTRIC ACTUATING ELEMENT

Yoshihiro Tanaka; Sadafusa Tsuji, both of Osaka; Yoshiaki Hata, Nishinomiya; Manabu Inoue, Kobe; Hiroshi Ootsuka, Sakai; Michihiro Iwata, Sakai; Fumiaki Ishito, Sakai, and Koh Hayama, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 13,561, Feb. 11, 1987, abandoned. This application Jun. 8, 1988, Ser. No. 203,891

Claims priority, application Japan, Feb. 12, 1986, 61-29399

Int. Cl.[4] G03B *7/08*

U.S. Cl. 354—457 4 Claims

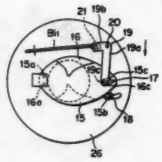
1. A camera, comprising:

a power source;

boosting means for boosting a voltage of said power source;

charging means for accumulating therein energy boosted by said boosting means;

piezo-electric means;
driven means including a shutter connected to be actuated by said piezo-electric means;
driving and controlling means for driving and controlling said piezo-electric means by energy accumulated in said charging means; and



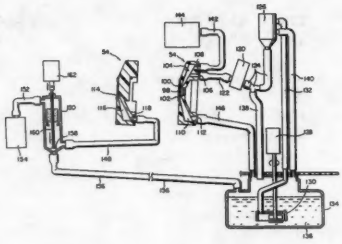
exposure controlling means for controlling said driving and controlling means to cause a charged voltage of said charging means to be applied to said piezo-electric means in a first polarity in order to order to said shutter and in a second polarity opposite to the first polarity in the course of the closing operation of said shutter.

4,873,545

METHOD OF DEVELOPING IMAGE ON ELECTROPHOTOGRAPHIC FILM

Keiichi Yamana; Masaru Imai, and Shuichi Ohtsuka, all of Ashigarakami, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 9, 1988, Ser. No. 230,288
Claims priority, application Japan, Oct. 24, 1986, 61-253130
Int. Cl.[4] G03G *15/10*
U.S. Cl. 355—256 **10 Claims**



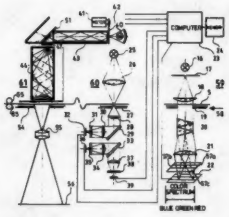
1. A developing method for developing an image on an electrophotographic film by means of a processing head which has a developing section in which said image is developed under the supply of a developer, said method comprising the steps of:
(a) pressing said electrophotographic film onto said processing head;
(b) supplying said developer to said developing section;
(c) applying, for a first predetermined period, a weak blast of pressurized gas to said developing section when the supply of the developer to said developing section is finished;
(d) applying, for a second predetermined period, a first strong blast of pressurized gas stronger than said weak blast to said developing section;
(e) suspending, for a third predetermined period, the applications of both the weak blast and the first strong blast of pressurized gas;
(f) applying, for a fourth predetermined period, a second strong blast of pressurized gas stronger than said weak blast to said developing section; and
(g) moving said electrophotographic film from said developing section at the earliest during the application of said second strong blast of pressurized gas to said developing section.

4,873,546

COLOR PRINTING METHOD AND APPARATUS

Wolfgang Zahn, Munich; Manfred Fürsich, Taufkirchen; Wilhelm Nitsch, Munich; Hans-Jürgen Rauh, Strasslach-Hailafing, and Helmut Ti iber, Munich, all of Fed. Rep. of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Oct. 28, 1988, Ser. No. 264,399
Claims priority, application Fed. Rep. of Germany, Nov. 6, 1987, 3737775
Int. Cl.[4] G03B *27/73*
U.S. Cl. 355—38 **30 Claims**



1. A method of copying a colored original onto color copy material, comprising the steps of passing light through said original, said light having blue, green and red components; forming a color spectrum from the light transmitted through said original, said spectrum extending across a first wavelength range corresponding to blue-containing radiation, a second wavelength range corresponding to green-containing radiation and a third wavelength range corresponding to red-containing radiation, and said copy material having respective first, second and third spectral sensitivities in said first, second and third ranges, said first, second and third spectral sensitivities being represented by first, second and third factors, respectively; measuring the intensity of the transmitted light in said first, second and third ranges to obtain respective first, second and third raw intensities; modifying said first, second and third raw intensities by said first, second and third factors, respectively, to obtain first, second and third corrected intensities; and calculating the amounts of blue, green and red copy light which will produce a copy of said original on said copy material in such a manner that said copy has a desired density, the calculating step being performed using said corrected intensities.

4,873,547

SHEET CONVEYING APPARATUS

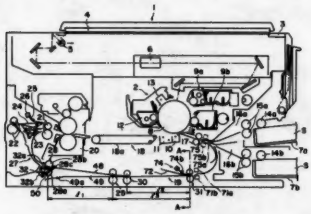
Nobukazu Sasaki, Tokyo; Toshirou Kasamura, Yokohama; Masashi Ohashi, Tokyo; Naoki Okuda, Kawasaki; Toshihiko Kusumoto, Tokyo; Yasunori Maeda, Inagi; Takashi Ozawa, Ichikawa; Yasuyoshi Yamamoto, Tokyo; Atsushi Kubota, Machida; Akiyoshi Kimura, Tokyo, and Makoto Masuda, Toride, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 97,662, Sep. 16, 1987, abandoned. This application Feb. 16, 1989, Ser. No. 311,380
Claims priority, application Japan, Sep. 18, 1986, 61-220511; Sep. 18, 1986, 61-220512; Dec. 26, 1986, 61-311579; Jan. 8, 1987, 62-002841
Int. Cl.[4] G03G *15/00*; B65H *3/04*
U.S. Cl. 355—316 **46 Claims**

1. A sheet conveying apparatus, comprising:
conveying means for accommodating a bundle of sheets in a form in which leading edges of the sheets are gradually

deviated in a sheet advancement direction, and for conveying the bundle as a whole;

feeding means, disposed downstream of said conveying means with respect to the sheet advancement direction, for feeding one by one the sheets of the bundle from the sheet closest to said feeding means; and



confining means for confining the sheets of the bundle other than the sheet being fed by said feeding means, said confining means including first and second members for gripping and stopping the bundle of the sheet by contacting respective sides of the bundle.

4,873,548

IMAGE FORMING APPARATUS COMPRISING A MAIN ASSEMBLY HAVING A TOP FRAME ADAPTED TO SWING OPEN AND CLOSED WITH RESPECT TO A BOTTOM FRAME AND HAVING PROCESS CARTRIDGE DETACHABLY MOUNTED IN THE MAIN ASSEMBLY

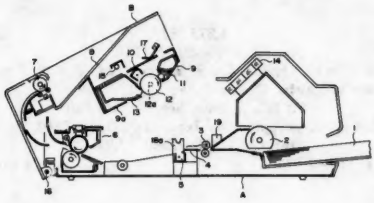
Hiroo Kobayashi; Hitoshi Fujino, both of Tokyo; Tadashi Yagi, Kawasaki; Nobukazu Adachi, Tokyo; Yasuyoshi Hayakawa, and Takeshi Setoriyama, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 869,872, Jun. 3, 1986, abandoned. This application Mar. 7, 1989, Ser. No. 319,893

Claims priority, application Japan, Jun. 6, 1985, 60-123060

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—200 **18 Claims**



1. An image forming apparatus comprising:

a main assembly including a first frame and a second frame which is adapted to assume closing and opening positions with respect to the first frame;

a process cartridge detachably mountable into the main assembly and containing at least a photosensitive member and process means contributable to image formation on the photosensitive member;

optical means provided in said first frame for applying light information to the photosensitive member of said cartridge;

a positioning member provided in said first frame and engagable with said cartridge when said second frame assumes its closing position;

supporting means provided in said second frame to detachably support said cartridge; and

a spring member provided in said second frame to urge said process cartridge, when loaded, toward said positioning member.

4,873,549

DEVICE FOR DETECTING THE LIFE OF AN IMAGE FORMING PROCESS UNIT, OPENING OF A SEAL OF THE UNIT AND ATTACHMENT OF THE UNIT TO AN IMAGE FORMING APPARATUS

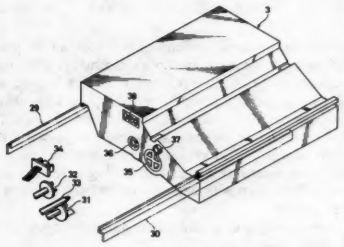
Tomio Tada; Junichi Hirobe, both of Osaka; Junichi Takamatsu, Hannan; Kazuto Hori, Sakai, and Yukihiro Aikawa, Osaka, all of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan

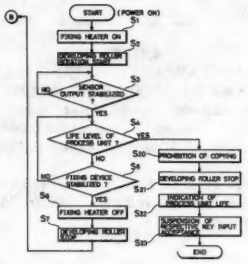
Filed Feb. 29, 1988, Ser. No. 161,571

Claims priority, application Japan, Mar. 3, 1987, 62-49606; Mar. 3, 1987, 62-49607; Mar. 3, 1987, 62-49610; Apr. 17, 1987, 62-95534

Int. Cl.[4] G03G *21/00*

U.S. Cl. 355—206 **21 Claims**





1. A device for detecting the life of a process unit having a toner and which is detachably mounted in an image forming apparatus comprising:

sensor means for detecting the density of the toner in said process unit;

signal detecting means receiving an output from said sensor means and operable to stabilize said output and to determine whether said stabilized output exceeds or is less than a predetermined value; and

control means connected to said signal detecting means and operable to effect different operating conditions depending on whether said stabilized output exceeds or is below said predetermined value, one of said operating conditions being an indication that the life of said process unit has expired and another of said operating conditions being an indication that the life of said process unit is unexpired.

4,873,550
ELECTROPHOTOGRAPHIC COPIER INCLUDING MEANS FOR SENSING THE SIZE OF AN ORIGINAL DOCUMENT

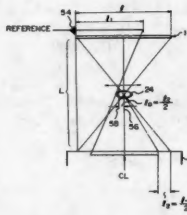
Toshio Watanabe, Yamato, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Mar. 15, 1988, Ser. No. 168,397

Claims priority, application Japan, Mar. 26, 1987, 62-44617[U]

Int. Cl.[4] G03G *15/04*

U.S. Cl. 355—232 **5 Claims**



1. An electrophotographic copier in which an original document laid on a glass platen and optics assembly, which includes a lens, are movable relative to each other to expose a photoconductive element imagewise via the optics assembly, and a resulting latent image produced on said photoconductive element is developed to become a visible image which is then transferred to a paper sheet, said copier comprising:

document size sensing means for sensing a size of said document which is positioned at one corner portion of said glass platen;

means for transporting said paper sheet with its center as a reference point; and

lens displacing means for changing a first position of said lens of said optics assembly to a second position based on said document size sensed by said document size sensing means.

4,873,551
DEVELOPING APPARATUS USING MAGNETIC CARRIER UNDER AC FIELD

Hatsuo Tajima, Matsudo; Atsushi Hosoi, Tokyo; Norihisa Hoshika, Kawasaki; Hiroshi Tajika, and Masahide Kinoshita, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 15, 1988, Ser. No. 168,434

Claims priority, application Japan, Mar. 16, 1987, 62-60454; Mar. 16, 1987, 62-60464

Int. Cl.[4] G03G *15/09*

U.S. Cl. 355—251 **14 Claims**

1. A developing apparatus, comprising:

a developer container for containing a developer containing toner particles and resin coated magnetic particles;

a developer carrying member opposed to a latent image bearing member to form a developing zone;

means for forming a layer of the developer on a surface of said developer carrying member;

means for forming a magnetic field in the developing zone for conveying the magnetic particles into the developing zone;

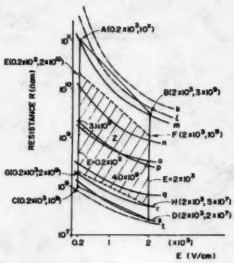
means for forming an alternating electric field between the latent image bearing member and said developer carrying member in the developing zone;

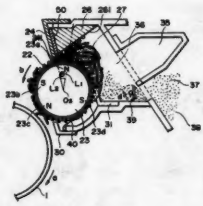
wherein said magnetic particles are high resistance particles exhibiting an electric field dependence property, wherein an electric resistivity curve of the magnetic particles on a coordinate graph wherein abscissa represents an electric field E (V/cm) applied to the magnetic particles, and ordinate represents an electric resistivity R (ohm-cm) of the magnetic particles crosses a zone defined by lines AB, BD, DC and CA,

where A is a point with coordinates (0.2×10^3, 10^{11});

B is a point with coordinates (2×10^3, 3×10^9); C is a point with coordinates (0.2×10^3, 10^8); and

D is a point with coordinates (2×10^3, 2×10^7),





wherein the resistivity R is measured by a sandwich type cell having electrodes with a clearance of 0.4 cm and having electrode area of 4 cm^2, in which 1 kg wt. is applied to one of the electrodes, and a voltage is applied across the electrodes.

4,873,552
READER-PRINTER

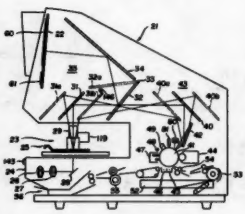
Hajime Otsuki, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Feb. 2, 1988, Ser. No. 151,520

Claims priority, application Japan, Feb. 2, 1987, 62-23222

Int. Cl.[4] G03G *15/00, 21/00*

U.S. Cl. 355—271 **34 Claims**



1. A reader-printer of the type which is adapted to project a recorded image of a microfilm on a screen and to print the image on a sheet of paper by projecting the image on a photosensitive medium, said reader-printer comprising:

a first specifying means for specifying a first area to be

printed on the paper from an image projected on said screen;

a second specifying means for specifying a second area located in a position different from that of said first area specified by said first specifying means;

a detection means for detecting the positional relationship between said first and second areas;

a shift means responsive to said detection means for shifting the projected image of said microfilm in the longitudinal and transverse directions with respect to said paper; and

an image forming means for forming the image defined within said first area on said paper in a position corresponding to said second area.

4,873,553

VARIABLE PRESSURE CONTROLS OF FIXING DEVICE IN ELECTROPHOTOGRAPHIC COPYING MACHINE

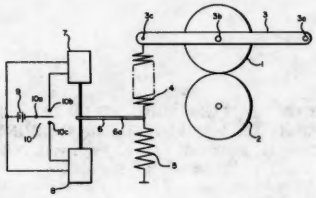
Masakatsu Inaba, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 107,848, Oct. 6, 1987, abandoned, which is a continuation of Ser. No. 869,328, Jun. 2, 1986, abandoned. This application Jul. 27, 1988, Ser. No. 225,627

Claims priority, application Japan, Jun. 14, 1985, 60-130509

Int. Cl.[4] G03G *15/20*

U.S. Cl. 355—295 **5 Claims**



1. A variable pressure control of a fixing device having a fixing roller and a compression roller in contact with each other and serving to fix a toner image on a transfer sheet by passing said sheet between said rollers, said control comprising:

an elastic means having one end operationally connected to said fixing roller so as to compress said fixing roller against said compression roller,

adjusting means for adjusting the elastic force of said elastic means such that said rollers press each other selectably at an increased pressure level or at a reduced pressure level, and

switching means for automatically controlling said adjusting means to select between said increased and reduced pressure levels according to the thickness of paper to be passed between said rollers.

4,873,554

ELECTROSTATOGRAPHIC MACHINE WITH WITHDRAWABLE COPY PAPER MODULE

Robert L. Greco, Jr., Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jun. 29, 1988, Ser. No. 213,027

Claims priority, application United Kingdom, Jul. 1, 1987, 8715481

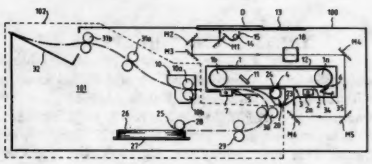
Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—309 **3 Claims**

1. Electrostatographic machine comprising:

a first portion including means for forming an electrostatic latent image on an imaging member; means for developing the electrostatic latent image with a developer material; and means for transferring, at a transfer station, the developed image to a copy sheet; and

a second portion comprising a module which is slidably mounted at one side of the first portion directly adjacent said transfer station, the module being separable from the first portion by being pulled out of the front of the machine;



the module including a copy sheet supply, a fuser for fusing developed images to the copy sheets, a copy sheet output receiver, and a copy sheet transport system for conveying copy sheets from the supply to the transfer station, from the transfer station to the fuser, and from the fuser to the output receiver.

4,873,555

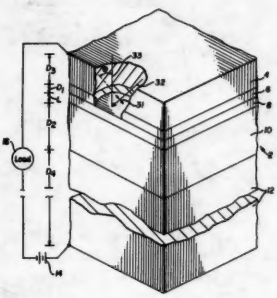
INTRABAND QUANTUM WELL PHOTODETECTOR AND ASSOCIATED METHOD

Darryl D. Coon, Pittsburgh, Pa.; Runkiri P. Karunasiri, Sherman Oaks, Calif., and Hui C. Liu, Pittsburgh, Pa., assignors to University of Pittsburgh of the Commonwealth System of Higher Education, Pittsburgh, Pa.

Filed Jun. 8, 1987, Ser. No. 58,972

Int. Cl.[4] H01L *27/12, 49/02, 29/161, 29/72*

U.S. Cl. 357—4 **18 Claims**



1. A photodetector comprising multiple layers of semiconductor material including:

an emitter layer;

a collector layer;

a quantum well layer disposed between said emitter layer and collector layer;

a first barrier layer between the emitter layer and the quantum well layer; and

a second barrier layer between the collector layer and the quantum well layer;

said first barrier layer having a band edge height establishing a first energy barrier which is higher than the band edge height of a second energy barrier established by the second barrier layer which in turn is higher than the Fermi level of the quantum well, and the thickness of the first barrier layer and height of the first energy barrier being such that electrons from the quantum well excited by photons flow from the quantum well through the second barrier layer but over the second energy barrier to the collector and are replaced by electrons which tunnel from the emitter layer through the first barrier layer to the

quantum well layer, the thickness of said second barrier layer being such that non substantial proportion of the electrons in the quantum well tunnel through the second energy barrier.

4,873,556

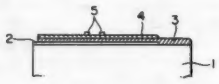
HETERO-JUNCTION DEVICE

Kenji Hyodo, Drexel Hill, Pa.; Hiroshi Koezuka, Nishinomiya, Japan, and Alan G. MacDiarmid, Drexel Hill, Pa., assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

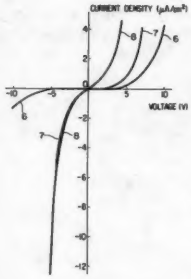
Continuation of Ser. No. 731,282, May 7, 1985, abandoned, which is a continuation of Ser. No. 052,227, May 15, 1987, abandoned. This application Mar. 25, 1988, Ser. No. 178,828

Int. Cl.[4] H01L *29/28*

U.S. Cl. 357—8 **12 Claims**



1 : SUBSTRATE
2 : METAL LAYER
3,4 : π-CONJUGATED SYSTEM POLYMER
5 : UPPER METAL LAYER



1. A hetero-junction device comprising a hetero-junction formed at the interface of a π-conjugated system polymer (A) and a π-conjugated system polymer (B), said π-conjugated system polymer (B) being deposited on said polymer (A) and being a different polymer from said polymer (A) to provide a non-ohmic behavior in a solid state condition.

4,873,557

MIS FET AND PROCESS OF FABRICATING THE SAME

Akio Kita, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Jun. 19, 1987, Ser. No. 67,413

Claims priority, application Japan, Jul. 3, 1986, 61-155089

Int. Cl.[4] H01L *29/78*

U.S. Cl. 357—23.1 **6 Claims**

1. An LDD MIS field effect transistor formed at the surface of a silicon substrate, comprising

a channel region in part of the substrate;

a gate insulating film formed on the channel region;

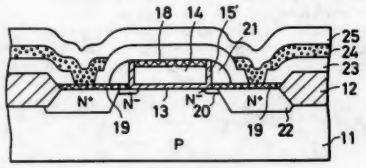
a gate electrode formed on the gate insulating film;

a lightly-doped region formed in the substrate adjacent to an end of the channel region;

a heavily-doped region formed in the substrate, said heavily-doped region being separated from the channel region by the lightly-doped region;

a metal silicide film formed on part of the lightly-doped region and the heavily doped region; and

a sidewall spacer formed on a side of the gate electrode, said



sidewall spacer being used as a mask during ion implantation for forming said heavily-doped region, such that said metal silicide separates said sidewall spacer from the substrate.

4,873,558

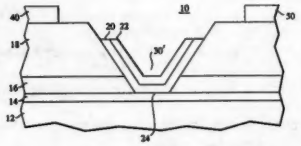
GROUP III-V COMPOUND FIELD EFFECT TRANSISTOR WITH DIFFUSION BARRIER

Arsam Antreasyan, Fanwood; Paul A. Garbinski, New Providence; Vincent D. Mattera, Jr., Flemington, and Henryk Temkin, Berkeley Heights, all of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Continuation-in-part of Ser. No. 13,328, Feb. 11, 1989. This application Feb. 23, 1988, Ser. No. 159,156

Int. Cl.[4] H01L *29/78, 29/201, 29/46*

U.S. Cl. 357—23.2 **14 Claims**



1. A field effect transistor comprising

a body having at least a surface layer which is semi-insulating, characterized by

a low-doped Group III–V compound epitaxial channel layer disposed on the semi-insulating surface layer,

a highly-doped Group III–V compound epitaxial contact-facilitating layer,

a low-doped Group III–V compound epitaxial barrier layer disposed between said channel and contact-facilitating layers and being sufficiently thick so as to prevent dopant impurities from diffusing from the latter into the former,

said channel layer having a bandgap not less than that of said contact-facilitating layer and said barrier layer,

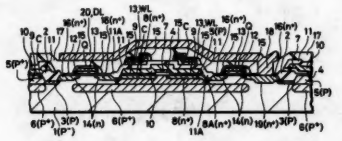
means forming source and drain contacts to said contact-facilitating layer, and

gate electrode means for controlling the flow of current in said channel and between said source and drain contacts.

4,873,559
SEMICONDUCTOR MEMORY DEVICE AND A PROCESS FOR PRODUCING THE SAME

Shinji Shimizu, Hoya; Osamu Tsuchiya, Ohme, and Katsuyuki Sato, Kodaira, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 855,418, Apr. 24, 1986, abandoned. This application Oct. 5, 1988, Ser. No. 253,779
Claims priority, application Japan, Apr. 24, 1985, 60-86393; May 24, 1985, 60-110361; May 24, 1985, 60-110362
Int. Cl.[4] H01L *29/78*
U.S. Cl. 357—23.6 **26 Claims**



1. A semiconductor integrated circuit device, comprising series circuits including a MISFET and a capacitor, as memory cells, comprising:

a semiconductor substrate of a first type of conductivity having a main surface;

a first semiconductor region of a second type of conductivity formed in said semiconductor substrate and extending to said main surface, said first semiconductor region serving as one electrode of said capacitor;

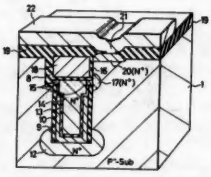
a second semiconductor region of the first type of conductivity formed under and in contact with said first semiconductor region, said second semiconductor region having an impurity concentration which is higher than the impurity concentration of said semiconductor substrate; and

a third semiconductor region, of the first type of conductivity, formed under said second semiconductor region said third semiconductor region having an impurity concentration which is higher than the impurity concentration of said second semiconductor region.

4,873,560
DYNAMIC RANDOM ACCESS MEMORY HAVING BURIED WORD LINES

Hideo Sunami, Tokyo; Shinichiro Kimura, Hachioji, and Toru Kaga, Urawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 16, 1988, Ser. No. 155,698
Claims priority, application Japan, Apr. 1, 1987, 62-77416
Int. Cl.[4] H01L *29/78, 29/06, 27/02*
U.S. Cl. 357—23.6 **42 Claims**



1. A semiconductor memory comprising,

a semiconductor substrate;

a plurality of memory cells, each including a deep hole bored in said semiconductor substrate;

a capacitor formed on a sidewall portion at the lower half of said deep hole, the capacitor comprising a storage node disposed inside said deep hole, a sheath type plate electrode, a capacitance insulating film disposed between said storage node and said sheath type plate electrode and an insulating film encompassing said sheath type plate electrode; and a switching transistor formed immediately above said capacitor;

word lines for selecting said memory cells, wherein at least half of each word line forms a gate of said switching transistor of each memory cell and is buried in one of a plurality of elongated recesses formed in a surface portion of said semiconductor substrate;

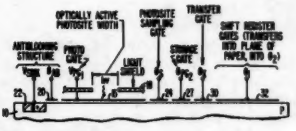
bit lines for transferring data; and

voltage impression means connected to said sheath type plate electrode which impresses a voltage to said sheath type plate electrode which is different from a voltage impressed to said semiconductor substrate.

4,873,561
HIGH DYNAMIC RANGE CHARGE-COUPLED DEVICE

David D. Wen, 248 Delphi Cir., Los Altos, Calif. 94022

Filed Apr. 19, 1988, Ser. No. 183,111
Int. Cl.[4] H01L *29/78*
U.S. Cl. 357—24 **17 Claims**



1. A semiconductor structure comprising:

a semiconductor substrate;

photogate means disposed in proximity to the substrate for creating a first depletion region in the substrate of first depth for the accumulation of charge in response to ambient electromagnetic radiation, the first depletion region being capable of containing a first quantity of charge;

storage gate means, spaced apart from the photogate means, disposed in proximity to the substrate for creating a second depletion region in the substrate of second depth, the second depth being greater than the first depth and the second depletion region being capable of containing a second quantity of charge less than the first quantity; and

sampling gate means disposed between the photogate means and the storage gate means for controllably isolating the second depletion region from the first depletion region to allow transfer of the second quantity of charge from the second depletion region without the first quantity of charge.

4,873,562
CHARGE-COUPLED DEVICE WITH LOWERING OF TRANSFER POTENTIAL AT OUTPUT AND FABRICATION METHOD THEREOF

Yvon Cazaux; Yves Thenoz, both of Grenoble; Didier Herault, Weyssinet, and Pierre Blanchard, Verrieres le Buisson, all of France, assignors to Thomson-CSF, Paris, France

Filed Dec. 21, 1988, Ser. No. 287,887
Claims priority, application France, Dec. 22, 1987, 87 17880
Int. Cl.[4] H01L *29/78*; G11C *19/28*
U.S. Cl. 357—24 **5 Claims**

1. A charge-coupled device comprising:

a semiconductor substrate with first type of doping,

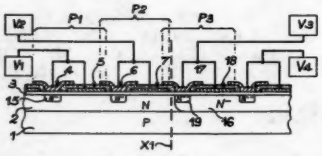
a semiconductor layer with a second type of doping covering this substrate,

an insulating layer covering this semiconducting layer, and, along one and the same axis defining a direction of flow of charges between an upstream position and an downstream position,

at least one first pair and one second pair of electrodes, each comprising, in said direction, a transfer electrode and a

storage electrode having surfaces of contact with the insulating layer,

with zones of a third type of doping being made so as to face the contact surfaces of the transfer electrodes of the first and second pairs, in the semiconducting layer of the second type, the electrodes of the first and second pairs being respectively connected to a first source and a second source of voltage varying cyclically and in phase opposition, between a first value and a second value, to create potential wells of equal depths, beneath and facing the storage electrodes, and identical and phase shifted potentials beneath and facing the transfer and storage electrodes of the first pair and the second pair, to make the charges flow in said direction;



said device comprising, from the downstream position, along said axis, in the direction of flow;

a semiconducting layer with a third type of doping made in the layer with the second type of doping,

at least one third pair of electrodes comprising, in said direction, a transfer electrode and a storage electrode having surfaces of contact with the insulating layer, and comprising means to create transfer potentials, beneath and facing the electrodes of the third pair, with values smaller than those of the transfer potentials beneath and facing the transfer and storage electrodes of the first pair and second pair.

4,873,563

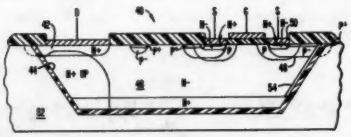
SOLID STATE MONOLITHIC SWITCHING DEVICE

Stephen L. Daleo, Parkville, Mo., and James B. Compton, Los Gatos, Calif., assignors to Synectics, Inc., Kansas City, Mo.

Filed May 2, 1988, Ser. No. 188,809

Int. Cl.[4] H01L *27/02*

U.S. Cl. 357—41 **7 Claims**



1. In a monolithic integrated double-diffused Metal Oxide Semiconductor circuit constructed on a dielectrically isolated monolithic silicon substrate, wherein individual components are formed within wells, each well formed by a dielectric isolation wall, the improvement comprising:

a source diffusion of said individual component abutted to said wall to form a diffusion/wall interface in silicon for maximizing use of area within said well and for minimizing undesired electric fields at the diffusion/wall interface;

a drain diffusion of said individual component abutted along a majority of its surface periphery to said wall to form a diffusion/wall interface in silicon for maximizing use of area within said well and for minimizing undesired electric fields at the diffusion/wall interface; and

a thin layer of dopant provided on at least a part of the inner surface of a side portion of the wall bridging said source diffusion and a bottom of said well and bridging said drain and said bottom of said well, said dopant being in sufficient concentration to prevent inversion along an interdiffusion channel of a parasitic MOSFET formable under expected operating conditions.

4,873,564

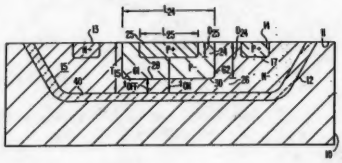
CONDUCTIVITY-MODULATED FET WITH IMPROVED PINCH OFF-RON PERFORMANCE

James D. Beasom, Melbourne Village, Fla., assignor to Harris Corporation, Melbourne, Fla.

Continuation-in-part of Ser. No. 790,117, Oct. 22, 1985, abandoned. This application Oct. 21, 1987, Ser. No. 110,775

Int. Cl.[4] H01L *29/06, 29/80, 27/12*

U.S. Cl. 357—49 **35 Claims**



1. A channel conductivity-modulated field effect semiconductor device comprising:

a body of semiconductor material of a first conductivity type having first and second surfaces;

a gate region of semiconductor material of a second conductivity type, opposite to said first conductivity type, extending from a top portion thereof at said first surface of said body to a bottom portion thereof a prescribed depth from said first surface, space apart apart from said second surface, and forming with the material of said body a PN junction, so that a channel region is defined between said PN junction at the bottom portion of said gate region and said second surface of said body; and

means, coupled to said body, for controllably injecting carriers of said second conductivity type into said body, whereby said carriers are caused to flow through and thereby modulate the conductivity of said channel region; and wherein

that portion of said gate region which is contiguous with and defines said PN junction at the bottom portion thereof is comprised of relatively high resistivity semiconductor material having a first, relatively low impurity concentration the profile of which gradually varies with depth from said first surface, and said gate region includes a portion of relatively low resistivity semiconductor material having a second, relatively high impurity concentration the profile of which changes abruptly with depth from said first surface, overlying said channel region and being contiguous with the relatively high resistivity semiconductor material thereof, such that said channel region lies beneath a portion of said gate region whereat said relatively high resistivity material and relatively low resistivity material portions are contiguous with one another and said relatively low resistivity material portion is spaced apart from said channel region therebeneath by material of said relatively high resistivity portion of said gate region and such that the composite of said first and second impurity concentration profiles has a knee at a bottom interface whereat said relatively high resistivity material and relatively low resistivity material regions are contiguous with one another, such that from said bottom interface to the bottom of said gate region the impurity concentration profile of said gate region varies from said knee in accordance with the profile of said first, relatively low impurity

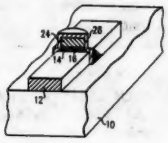
concentration, and from said bottom interface toward said first surface the impurity concentration profile of said gate region varies abruptly from said knee in accordance with the profile of said second relatively high impurity concentration, whereby, during the on-condition of said device, said channel region is effectively established between said second surface of said body and the bottom interface of said portion of relatively low resistivity material and said portion of relatively high resistivity material whereat the composite of said first and second impurity concentration profiles undergoes an abrupt change at said knee, during turn-off of said device said low resistivity portion provides a low resistance path for removal of carriers of said second conductivity type and, in the off-condition of said device, said channel region is confined between said PN junction at the bottom portion of said gate region and said second surface of said body.

4,873,565

METHOD AND APPARATUS FOR PROVIDING INTERCONNECTION BETWEEN METALLIZATION LAYERS ON SEMICONDUCTOR DEVICES

Bobby A. Roane, Manvel, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 2, 1987, Ser. No. 115,282
Int. Cl.[4] H01L *23/48, 45/00, 29/04*
U.S. Cl. 357—71 **13 Claims**



1. A semiconductor device interconnection between first and second metallization levels separated by an insulator, comprising:

a solid stud with vertical sidewalls extending from the first level of metallization through the insulator into contact with the second level of metallization;

said stud clad with a corrosion-preventing material on said vertical sidewalls and a top surface thereof.

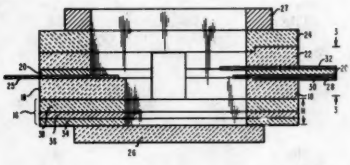
4,873,566

MULTILAYER CERAMIC LASER PACKAGE

John L. Hokanson, Upper Milford Township, Lehigh County; Palmer D. Smeltz, Jr., Ruscombmanor Township, Berks County; Katherine A. Yanushefski; Michael J. Yanushefski, both of Hanover Township, Northampton County, and Craig A. Young, Nazareth, all of Pa., assignors to American Telephone and Telegraph Company, Murray Hill and AT&T Bell Loboratories, AT&T Technologies Inc., Berkeley Heights, both of, N.J.

Continuation-in-part of Ser. No. 792,056, Oct. 28, 1985, abandoned. This application Jan. 15, 1987, Ser. No. 8,051
Int. Cl.[4] H01L *23/02, 23/12*
U.S. Cl. 357—74 **48 Claims**

1. A package for semiconductor optical communication devices comprising an electrically nonconductive housing having an opening for allowing insertion of an optical transmission fiber and including a multilayer microwave transmission line for providing a connection between a high bit rate input



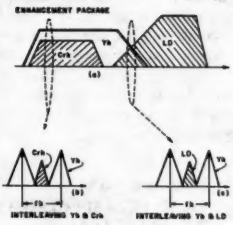
signal source and said semiconductor optical communication devices.

4,873,567

EXTENDED HORIZONTAL RESOLUTION OF LUMINANCE AND CHROMINANCE IN A HIGH DEFINITION TELEVISION SYSTEM

Mikhail Tsinberg, Riverdale, N.Y., assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 13, 1987, Ser. No. 84,968
Int. Cl.[4] H04N *7/04*
U.S. Cl. 358—12 **6 Claims**



1. A system for transmitting a television signal for producing a high definition television image, comprising:

(a) means for separating said television signal into a first signal and a second signal having separate frequency bands, said second signal comprising a line differential signal for providing enhanced vertical detail in said television image, a wide bandwidth luminance signal and a wide bandwidth chrominance enhancement signal;

(b) first filter means for receiving said wide bandwidth luminance signal and for passing a high frequency component thereof;

(c) second filter means for receiving said wide bandwidth chrominance enhancement signal and for passing high frequency components thereof;

(d) a first vertical filter means connected to said first filter means for receiving and vertically filtering said high frequency component of said luminance signal;

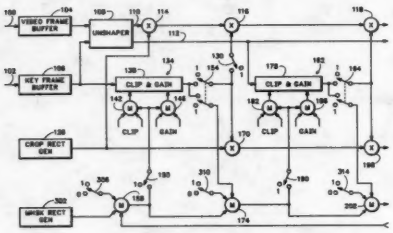
(e) second vertical filter means connected to said second filter means for receiving and vertically low pass filtering said high frequency components of said chrominance enhancement signal; and

(f) means connected to said first vertical filter means and said second vertical filter means for frequency interleaving most of the frequency band of said high frequency component of said luminance signal with said high frequency components of said chrominance enhancement signal and further frequency interleaving the upper portion of said frequency band with said line differential signal.

4,873,568
DIGITAL VIDEO EFFECTS APPARATUS

Richard A. Jackson; John Abt, and Ronnie D. Barnett, all of Nevada City, Calif., assignors to The Grass Valley Group, Inc., Nevada City, Calif.

Filed Sep. 19, 1988, Ser. No. 246,054
Int. Cl.[4] H04N 5/272, 5/275
U.S. Cl. 358—22 27 Claims

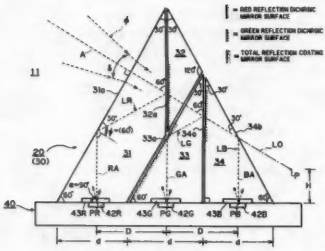


1. A digital video effects apparatus comprising:
(a) input means for receiving a digital input video signal representing the distribution of optical information over a video field,
(b) means for providing a digital key signal that defines an area of the video field,
(c) means for providing a digital mask signal that defines at least a portion of said area of the video field,
(d) means for combining the digital mask signal with the digital key signal and providing a modified digital key signal, and
(e) output means for acting on the input video signal in accordance with the modified key signal to provide an output video signal.

4,873,569
IMAGE READER HAVING SPECTROSCOPE FOR COLOR SEPARATION

Makoto Hirosawa, Kyoto, Japan, assignor to Dainippon Screen Mfg. Co., Ltd., Japan

Filed May 12, 1988, Ser. No. 193,829
Claims priority, application Japan, May 15, 1987, 62-119339
Int. Cl.[4] H04N 1/46, 9/097
U.S. Cl. 358—75 5 Claims

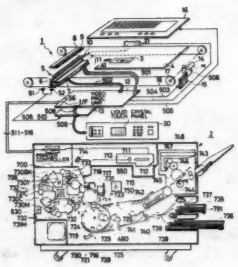

= RED REFLECTION DICHROIC MIRROR SURFACE
= GREEN REFLECTION DICHROIC MIRROR SURFACE
= TOTAL REFLECTION COATING MIRROR SURFACE
43R PR 42R
43G PG 42G
43B PB 42B

1. An image reader for separating light from scanning lines of an original image into color light components and for receiving said color light components by respective linear image sensors to read each of said scanning lines of said original image, comprising:
(a) an optical system for converting light from an original image into image-formation light;
(b) a spectroscope for forming and directing color light components of said image-formation light; and
(c) an image sensing device fixed to said spectroscope, said image sensing device including linear image sensors for receiving said color light components, said linear image sensors including surfaces for receiving said color light components; and
wherein said spectrocsope includes:
(1) a plurality of transparent bodies;
(2) a light incident plane for allowing said image-formation light to enter the interior of said spectroscope, said plane being adapted to be substantially perpendicular to the optical axis of said image-formation light;
(3) color separation planes for selectively reflecting said image-formation light in said interior of said spectroscope to separate said image-formation light into said color light components;
(4) optical axis direction changing planes for reflecting said color light components and directing said color light components to form images on said surfaces of said linear image sensors, said optical axis direction changing planes being adapted to direct said color light components such that said images formed on said surfaces of said linear image sensors have a common conjugate position with respect to said spectroscope, said optical axis direction changing planes being adapted to direct each of said color light components onto said surfaces of said linear image sensors in a direction which is perpendicular to said surfaces of said linear image sensors;
(5) means for totally reflecting said color light components at said optical axis direction changing planes; and
(6) means for reflecting said color light components either an exclusively even number of times or an exclusively odd number of times.

4,873,570
COLOR IMAGE PROCESSING APPARATUS FOR SELECTIVELY ALTERING IMAGE COLORS

Yasumichi Suzuki; Yoshinori Ikeda, both of Tokyo; Koichi Katoh, Yokohama; Tetsuya Ohnishi, Yokohama; Toshihiro Kadowaki, Yokohama, and Toshio Honma, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 13, 1987, Ser. No. 120,820
Claims priority, application Japan, Nov. 14, 1986, 61-271450; Nov. 14, 1986, 61-271451; Jan. 19, 1987, 62-9468; May 15, 1987, 62-119311
Int. Cl.[4] H04N 1/40
U.S. Cl. 358—80 17 Claims



1. A color image processing apparatus comprising:
first color appointing means for appointing any desired color involved in an original image;
color range changing means for changing a size of a range of colors which can be regarded as being the same as said desired color;

second color appointing means for appointing a target color to which said desired color is to be converted; and

color image forming means for forming a color image with said desired color and colors in said color range converted into said target color.

4,873,571

DEVICE FOR POSITIONING A MOCK-UP IN THREE DIMENSIONS, IN PARTICULAR FOR STUDYING BACKSCATTERING FROM SAID MOCK-UP

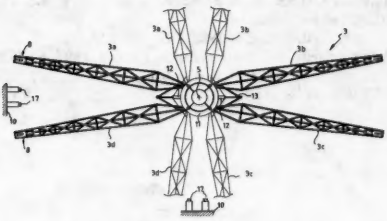
Daniel Balet, Maisons-Lafitte; Renzo Chiomento, Gargenville; Louis Beaulieu, Guyancourt, and Yves Poncel, Marly-le-Roi, all of France, assignors to Electronique Serge Dassault, Saint Cloud, France

Filed Jul. 13, 1988, Ser. No. 218,619

Claims priority, application France, Jul. 31, 1987, 87 10921

Int. Cl.[4] H04N *7/18*

U.S. Cl. 358—93 16 Claims



1. A positioning device for supporting a mock-up during backscattering measurements at microwave frequencies, in a position which may be varied, at least in attitude, relative to an illumination axis , said positioning device comprising:

(a) a top support including four top support end portions which are movable between at least two sets of relative positions in a top plane, said top support being rotatable relative to a second axis substantially perpendicular to said illumination axis, said second axis passing substantially through a middle portion of said top support;

(b) a bottom support including four bottom support end portions which are also movable from at least two relative positions but in a bottom plane below said top plane, said bottom support also being rotatable about said second axis, said second axis also passing substantially through a middle portion of said bottom support;

(c) four top wires each having a lower end fixed to a top portion of the mock-up and extending upwardly to a respective one of said top support end portions;

(d) four bottom wires each having an upper end fixed to a bottom portion of the mock-up and extending downwardly to a respective one of said bottom support end portions;

(e) tensioning means operatively coupled to each of the top support end portions and the bottom support end portions for adjusting the respective tensions and effective lengths of said top and bottom wires as a function of a desired attitude and altitude for the mock-up; and

(f) control means for controlling the angular positions of said top and bottom supports, the relative positions of said top support end portions and the relative positions of said bottom support end portions, as a function of a desired attitude for the mock-up relative to said illumination axis.

4,873,572

ELECTRONIC ENDOSCOPE APPARATUS

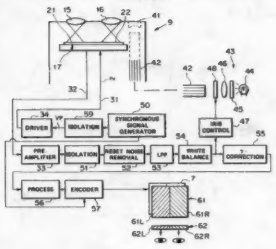
Akihiko Miyazaki; Tetsuo Nonami, both of Hachioji, and Yuji Ikuno, Oume, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Feb. 24, 1988, Ser. No. 160,051

Claims priority, application Japan, Feb. 27, 1987, 62-44480; Mar. 31, 1987, 62-79196

Int. Cl.[4] A61B *1/04, 1/06*

U.S. Cl. 358—98 30 Claims



1. An electronic endoscope apparatus comprising:

an elongate insertable part;

two image forming optical systems provided in the tip part of said insertable part; and

an imaging means provided in the tip part of said insertable part, having two imaging regions in which object images are formed by said two image forming optical systems and made integral.

4,873,573

VIDEO SIGNAL PROCESSING FOR BANDWIDTH REDUCTION

Graham A. Thomas, Tadworth, and Timothy J. Borer, Banstead, both of United Kingdom, assignors to British Broadcasting Corporation, London, England

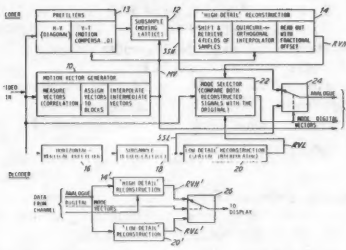
PCT No. PCT/GB86/00795, § 371 Date Jan. 25, 1988, § 102(e) Date Jan. 25, 1988, PCT Pub. No. WO87/05770, PCT Pub. Date Sep. 24, 1987

PCT Filed Dec. 23, 1986, Ser. No. 127,664

Claims priority, application United Kingdom, Mar. 19, 1986, 8606809; Jul. 16, 1986, 8617320; Sep. 4, 1986, 8621330

Int. Cl.[4] H04N *7/12*

U.S. Cl. 358—133 25 Claims



1. Receiving or playback apparatus for a reduced bandwidth video signal accompanied by a digital signal carrying motion vector information pertaining individually to a plurality of blocks of pixels, characterized by means for accumulating sub-sample points from the fields of each of a repeating cycle of fields, and means responsive to the motion vector information to shift the sub-sample points in accordance with the

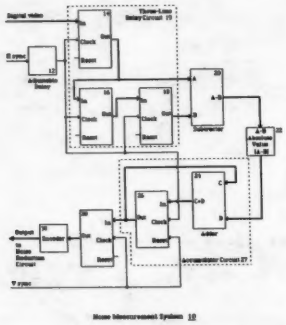
corresponding motion vector information so that the accumulated points provide a high-definition picture both in stationary areas and moving areas which are correlated from field to field.

4,873,574

NOISE MEASUREMENT FOR VIDEO SIGNALS

Ted A. Darby, Knoxville, Tenn., assignor to North American Philips Corporation, New York, N.Y.

Filed Dec. 20, 1988, Ser. No. 288,061
Int. Cl.[4] H04N *17/00, 17/02*
U.S. Cl. 358—139 20 Claims



1. A noise measurement system in a television signal receiver that receives a composite television picture signal having noise, picture information, vertical synchronization pulses indicating television picture frames, horizontal synchronizing pulses indicating television scan lines, and a standard signal that occurs repeatedly in the television signal and that would be the same at each occurrence but for noise, the system comprising:

means for producing at least two samples of the standard signal taken at different times;

means for comparing the at least two standard signal samples and for generating a comparison signal that is representative of the comparison of the at least two standard signal samples; and

means for receiving the comparison signal and for generating a measured noise signal that is representative of the noise in the composite television picture signal as measured by at least one comparison signal.

4,873,575

CIRCUIT ARRANGEMENT FOR ENHANCING THE HORIZONTAL DEFINITION OF A TELEVISON SIGNAL

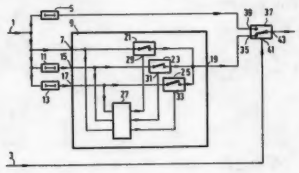
Gerard De Haan, Eindhoven, Netherlands, assignor to U. S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 145,858, Jan. 20, 1988, abandoned. This application Feb. 16, 1989, Ser. No. 312,320
Claims priority, application Netherlands, Jan. 23, 1987, 8700162
Int. Cl.[4] H04N *5/14*
U.S. Cl. 358—166 7 Claims

1. A circuit arrangement for enhancing the horizontal definition of an interlaced television signal comprising a plurality of pictures, said circuit arrangement having a circuit input coupled to a television signal source for applying thereto a first plurality of horizontal samples having a vertical position, sampled from a first picture of said television signal, and a second plurality of horizontal samples having said vertical position, sampled from a successive picture in anti-phase with respect to said first picture, wherein said circuit arrangement comprises:

a selection circuit having three inputs and an output;

means coupled to said circuit input for applying to each of said three selection circuit inputs respectively, three horizontally successive samples comprising alternate ones of said first and second horizontal samples having the same vertical position; and



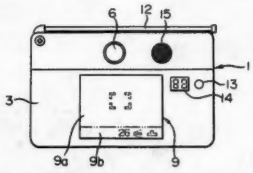
means for providing at said output the one of said horizontal samples applied at said selection circuit inputs at any instant which has an amplitude at that instant which is closest in value to the mean value of the amplitudes of said applied horizontal samples.

4,873,576

CAMERA EQUIPPED WITH A TELEVISION SET

Tsuyoshi Hattori; Masanao Tanaka, both of Hino, and Syoji Matsuzaka, Hachioji, all of Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Aug. 2, 1988, Ser. No. 227,390
Claims priority, application Japan, Mar. 8, 1987, 62-192721
Int. Cl.[4] H04N *5/30, 5/64*
U.S. Cl. 358—224 5 Claims



1. A camera for taking photographs comprising:

a unitary casing for housing the camera and a television;

the camera including a mirror positioned interiorly of said unitary casing for receiving the subject image being viewed and projecting said subject image on a CCD area image sensor provided interiorly of said unitary casing;

a liquid crystal display means housed in said unitary casing and visible from the exterior of said unitary casing operable in first and second operational modes for selectively receiving and displaying said subject image from said CCD area image sensor and for displaying a television signal generated from said television, respectively; and

selection means attached to said unitary housing for manual selection of one of said first and second operational modes.

4,873,577

EDGE DECOMPOSITION FOR THE TRANSMISSION OF HIGH RESOLUTION FACSIMILE IMAGES

Christodoulos Chamzas, West Long Branch, N.J., assignor to American Telephone and Telegraph Company, New York, N.Y. and AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jan. 22, 1988, Ser. No. 146,917
Int. Cl.[4] H04N *1/415, 1/40*
U.S. Cl. 358—426 21 Claims

1. A method for decomposing a high resolution image into a low resolution replica and supplemental information for facsimile storage or transmission, comprising the steps of:

a. obtaining a super pixel, including a plurality of high resolution pixels, from a high resolution image source;

b. determining whether a low resolution pixel being generated from said super pixel is at an edge in a low resolution replica being generated,

if so, generating supplemental information for said low resolution pixel being generated in accordance with first prescribed criteria dependent on said high resolution pixels in said super pixel and generating said low resolution pixel having a tone determined in accordance with second prescribed criteria,

if not, determining whether said low resolution pixel being generated requires supplemental information and, if so, generating supplemental information for said low resolution pixel being generated in accordance with said first prescribed criteria and selecting the tone of said low resolution pixel being generated so that it is at an edge in said low resolution replica and, if not, generating said low resolution pixel having a tone determined in accordance with third prescribed criteria;

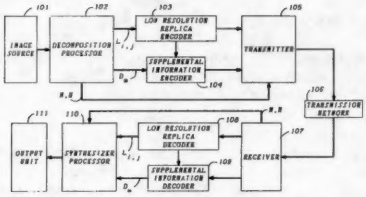
c. outputting said supplemental information, if any;

d. outputting a representation of said generated low resolution pixel tone;

e. obtaining a next super pixel from said high resolution image source as in step (a);

f. repeating steps (b) through (e) until the high resolution image has been decomposed to a low resolution replica plus supplemental information, if any.

8. A method for recomposing a high resolution image from received low resolution pixel information from a low resolution replica and received supplemental information, comprising the steps of:



a. obtaining a low resolution pixel from the low resolution replica;

b. determining whether said obtained low resolution pixel is at an edge in the low resolution replica,

if so, obtaining received supplemental information corresponding to said low resolution pixel and substituting said obtained supplemental information for said low resolution pixel to generate a high resolution super pixel in the high resolution image being recomposed, said high resolution super pixel including a plurality of high resolution pixels each having a tone determined from said supplemental information,

if not, generating a high resolution super pixel in the high resolution image being recomposed, said high resolution super pixel including a plurality of high resolution pixels each having a tone the same as said low resolution pixel;

c. outputting said high resolution pixels of said super pixel;

d. obtaining a next low resolution pixel as in step (a);

e. repeating steps (b) through (d) until the high resolution image has been recomposed.

11. Apparatus for decomposing a high resolution image into a low resolution replica and supplemental information for facsimile storage or transmission comprising:

a source of a high resolution image having a first plurality of high resolution pixels;

means for obtaining super pixels in a predetermined sequence from said image source, each of said super pixels including a second plurality of high resolution pixels;

means for generating low resolution pixels to be substituted for corresponding ones of said super pixels;

means for determining whether each of said low resolution pixels being generated is at an edge in a low resolution replica being generated;

means for generating supplemental information in accordance with first prescribed criteria for each of said low resolution pixels being generated determined to be at an edge;

said means for generating said low resolution pixels including means for generating a tone for each of said low resolution pixels being generated determined to be at an edge in accordance with second prescribed criteria;

means for determining whether supplemental information is required for individual ones of said low resolution pixels being generated;

means for generating supplemental information for individual ones of said low resolution pixels being generated determined to require it in accordance with said first prescribed criteria;

means for selecting the tone of said individual ones of said low resolution pixels being generated which require said supplemental information so that they are at an edge in said low resolution replica;

means for generating a tone for each of said low resolution pixels being generated determined not to require supplemental information in accordance with third prescribed criteria;

means for outputting representations of the tones of said generated low resolution pixels; and

means for outputting said supplemental information, if any.

18. Apparatus for recomposing a high resolution replica from received low resolution pixel information from a low resolution replica and received supplemental information comprising:

means for obtaining low resolution pixels from the received low resolution replica;

means for determining whether individual ones of said obtained low resolution pixels are at an edge in said low resolution replica;

means for obtaining supplemental information for individual ones of said low resolution pixels determined to be at an edge and for substituting said supplemental information for said low resolution pixel at an edge to generate a high resolution super pixel in the high resolution image being recomposed, said high resolution super pixel having a plurality of high resolution pixels, each having a tone determined from said supplemental information;

means for generating a high resolution super pixel for each low resolution pixel not at an edge, said high resolution super pixel having a plurality of high resolution pixels, each of said high resolution pixels having a tone the same as that of a corresponding low resolution pixel; and

means for outputting said high resolution pixels.

4,873,578

VIDEO CIRCUIT ENCLOSURE FOR ATTACHMENT TO A CATHODE RAY TUBE

Keith I. Tognoni, Winchester; John Fitzgerald, Leominster; Glenn Welch, Lynnfield, and Paul Yonkers, North Chelmsford, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Jul. 28, 1987, Ser. No. 78,778
Int. Cl.[4] H04N *5/645*
U.S. Cl. 358—254 **18 Claims**

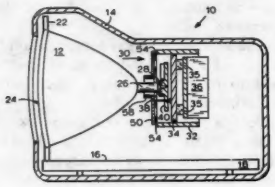
1. A video circuit enclosure for attachment to a cathode ray tube, the cathode ray tube having a screen face and a neck extending away from the face, said neck having at least one conductive terminal for the cathode ray tube, the video circuit enclosure comprising:

(a) video box formed of conductive material so as to form a shield, said box disposed over the portion of the cathode ray tube have the conductive terminals, said box forming an open face into which the cathode ray tube neck is inserted;

(b) a video board secured inside said video box, said video board including at least a video circuit for supplying signals to the cathode ray tube;

(c) a socket board disposed inside said video box closely spaced from said video board, said socket board having a socket means for coupling to the cathode ray tube so that it is attached thereto and in electrical contact with the cathode ray tube terminal;

(e) an electrical connection means connected to said socket



means able to maintain a conductive path for signal transfer therebetween when said video board and said socket board move relative to each other; and

(d) a video cover formed of conductive material disposed over said video box open face and forming an hole the cathode ray tube is positioned in, said video cover attached to said socket board and spaced away therefrom so that when said socket board is disposed in said video box, said video cover is in electrical contact with said video box.

4,873,579

IMAGE INFORMATION READING APPARATUS

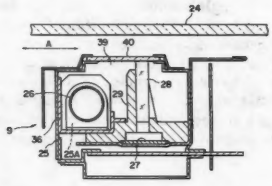
Tooru Kubota, and Hiroyuki Mori, both of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 6, 1988, Ser. No. 240,654

Claims priority, application Japan, Sep. 7, 1987, 62-223346

Int. Cl.[4] H04N *1/10*

U.S. Cl. 358—471 **9 Claims**



1. An apparatus for reading an image from an image data-containing sheet, comprising:

support means for supporting the sheet mounted thereon;

first illuminating means for illuminating the sheet with light, said first illuminating means extending in a first direction which is parallel to a surface of the sheet;

first housing means for housing said first illuminating means so as to seal said illuminating means therein, said first housing means including a transparent section through which the light emitted from said first illuminating means and is directed toward the sheet;

photoelectric converting means, which extends parrallel to said first direction, for converting the light reflected from the sheet into electric signals; and

driving means for simultaneously driving said first illuminating means and said photoelectric converting means in a second direction which is parallel to the surface of the sheet and is perpendicular to said first direction.

4,873,580

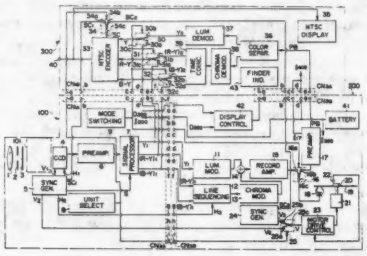
DETACHABLE UNIT ELECTRONIC CAMERA

Akira Katoh; Masatoshi Ida, both of Hachioji; Yutaka Yunoki, Kunitachi; Hisayuki Harada, Hachioji; Manabu Inoue, Kokubunji, and Yoshio Fukuda, Hino, all of Japan, assignors to Olympus Optical Co., Ltd., Japan

Division of Ser. No. 797,025, Nov. 12, 1985, Pat. No. 4,746,990. This application Apr. 12, 1988, Ser. No. 180,822

Int. Cl.[4] H04N *5/76, 5/06*

U.S. Cl. 358—335 **10 Claims**



1. An independent connector means for use in a multi-unit electronic camera system having units capable of performing the functions of photographing an image, recording and playing back an image and monitoring an image being photographed, said system being comprised of a plurality of independent units each having an array of coupling terminals arranged along one side of a housing for each unit; said independent connector means being provided for electrically coupling an array of terminals provided on the housing of one of said units with an associated array of terminals provided on the housing of another one of said units;

said independent connector means comprising a connector means housing containing a sync signal generator for supplying a plurality of different output sync signals;

first and second groups of terminals being arranged along said independent connector mean housing; and

at least one terminal from each of said first and second groups of terminals being coupled in common for receipt of one of said output sync signals to enable said independent connector means to couple said sync signals to those units of said system which are respectively connected to said first and second groups of terminals.

4,873,581

FIELD/FRAME CONVERSION CIRCUIT

Yoshiki Iwase, and Yasuhito Kobayashi, both of Tokyo, Japan, assignors to Fuji Photo Film Co. Ltd., Kanagawa, Japan

Division of Ser. No. 46,710, May 7, 1987, Pat. No. 4,812,919. This application Oct. 24, 1988, Ser. No. 261,624

Claims priority, application Japan, May 8, 1986, 61-105749; May 8, 1986, 61-105750; May 8, 1986, 61-105753; May 8, 1986, 61-105754; Aug. 4, 1986, 61-182963

Int. Cl.[4] H04N *5/76, 9/79*

U.S. Cl. 358—310 **10 Claims**

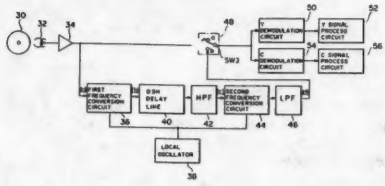
1. A field/frame conversion circuit comprising:

first frequency conversion means adapted to convert the frequency of a repetitively input, frequency modulated field signal on the higher band side than the frequency band of said field signal;

signal delay means adapted to delay a frequency modulated field signal output from said first frequency conversion means only by 0.5 horizontal scan period;

a filter adapted to extract the upper band component of a frequency modulated field signal output from said signal delay means;

second frequency conversion means adapted to convert the frequency of a signal output from said filter to the same frequency of said repetitively input frequency modulated field signal; and,



signal switching means adapted to select a frequency modulated field signal output from said second frequency conversion means and delayed only 0.5 horizontal scan period and said repetitively input, frequency modulated field signal not delayed alternately at every one vertical scan period to thereby output a frame signal.

4,873,582

VIDEO SIGNAL AND METHOD THEREFOR TIME AXIS ALTERING CIRCUIT USED IN A VIDEO TAPE RECORDER FOR RECORDING A BROADBAND VIDEO SIGNAL

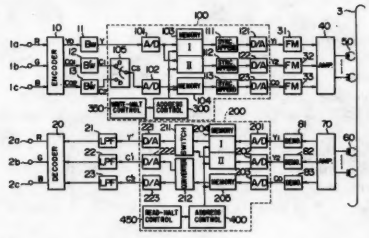
Takashi Furuhata, Yokohama; Hitoaki Owashi, Katsuta; Takayasu Ito, and Masakazu Hamaguchi, both of Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 33,265, Apr. 2, 1987, abandoned. This application Jun. 21, 1988, Ser. No. 210,167

Claims priority, application Japan, Apr. 2, 1986, 61-74217

Int. Cl.[4] H04N *9/79, 5/76*

U.S. Cl. 358—310 **18 Claims**



1. A video signal time axis altering circuit for transforming a broad-band video signal including a blanking signal with a period τ into narrow-band video signals in a plurality of channels by dividing said broad-band video signal into signals in a plurality (N; $N \geqq 2$) of channels on the time axis and expanding the divided signals on the time axis, said circuit comprising:

(a) an analog-to-digital converting circuit which receives said broad-band video signal and quantizes said signal into a digital signal;

(b) a memory connected to said analog-to-digital converting circuit and having a plurality of storage areas, said memory receiving a quantized video signal from said analog-to-digital converting circuit and storing said quantized video signal in said storage areas by dividing said quantized video signal into a plurality of signals in a predetermined period;

(c) a plurality of digital-to-analog converting circuits each of which receives a quantized video signal retrieved from each of said storage areas of said memory and converts said signal into an analog signal;

(d) an address control signal generating circuit which is connected to said memory, produces a writing clock signal for controlling the writing of said quantized video signal to said memory and a reading clock signal for controlling the reading of stored video signal out of said memory, and supplies said writing clock signal and reading clock signal to said memory, said writing clock signal having a frequency f_1 determined in such a relation with a frequency f_2 of said reading clock signal of $f_1 > N \times f_2$; and

(e) a write-halting control circuit which is connected to said address control signal generating circuit and produces a signal which causes said writing clock signal to halt temporarily the writing of said quantized video signal to said memory in said blanking signal period τ.

4,873,583

MAGNETIC TAPE RECORDING/REPRODUCING APPARATUS

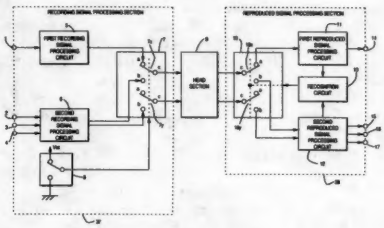
Massaki Kobayashi, Kawanishi; kazuhiro Yamanishi, Kashiwara; Akihiro Takeuchi, Ikoma, and Yoshitomi Nagaoka, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 18, 1986, Ser. No. 943,200

Claims priority, application Japan, Dec. 18, 1985, 60-284885

Int. Cl.[4] H04N *9/79, 5/76*

U.S. Cl. 358—310 **6 Claims**



1. A magnetic tape recording/reproducing apparatus comprising:

a recording signal processing section for converting a video signal to one or more recordable signals;

a head section having a plurality of magnetic heads mounted on a signal rotary cylinder for recording said on or more recordable signals on a magnetic tape and for reproducing said one or more recordable signals which have been recorded from said magnetic tape; and

a reproduced signal processing section for converting said one or more reproduced signals from said head section to said video signal,

wherein said recording signal processing section comprises: a first recording signal processing circuit for converting a fist kind of video signal to a 1-channel video signal; a second recording signal processing circuit for converting a second kind of video signal to 2-channel component signals; and a first switch circuit for selectively connecting one of said first and second recording signal processing circuits to said head section, and

wherein said reproduced signal processing section comprises: a first reproduced signal processing circuit for converting said 1-channel video signal reproduced from said head section to said first kind of video signal; a second reproduced signal processing circuit for converting said 2-channel component signals reproduced from said head section to said second kind of video signal; a second switch circuit for selectively connecting one of said first and second reproduced signal processing circuits to said head section; and a recognition circuit for recognizing

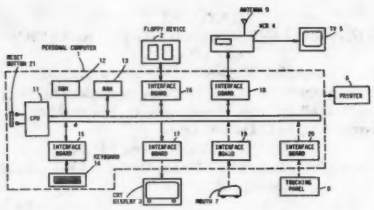
which of said 1-channel video signal and said 2-channel component signals are reproduced from said head section and producing a control signal for controlling said second switch circuit.

4,873,584

COMPUTER CONTROL FOR VCR INCLUDING DISPLAY OF RECORD PLAYBACK LISTING AND PLAYBACK ORDER SELECTION

Kazuo Hashimoto, Tokyo, Japan, assignor to Hashimoto Corporation, Tokyo, Japan

Filed Jul. 5, 1988, Ser. No. 215,345
Claims priority, application Japan, Jul. 3, 1987, 62-166432
Int. Cl.[4] H04N 5/76
U.S. Cl. 358—335 **13 Claims**



1. A VCR control system, comprising

means for storing a list of television programs which were recorded in accordance with an individual program table of a user during a predetermined time period;

means for displaying the list of television programs to the user;

means for changing the order of playback of recorded programs to a new order different from the order displayed; and

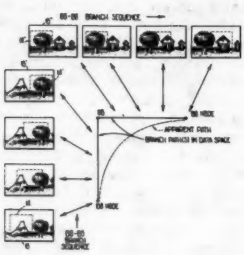
means for automatically rewinding and fast forwarding the VCR to play back the recorded programs in the new order whereby if the user does not have sufficient time to watch all recorded programs, he or she can play back selected recorded programs in the new order.

4,873,585

METHOD OF SELECTIVELY RETRIEVING VIDEO IMAGES FROM A VIDEO REPRODUCER FOR SIMULATING MOVEMENT

Keith A. Blanton, Alpharetta; William M. Finlay, Tucker; Michael J. Sinclair, Lilburn, and John E. Tumblin, Decatur, all of Ga., assignors to Ivex Corporation, Norcross, Ga.

Division of Ser. No. 648,725, Sep. 7, 1984, Pat. No. 4,752,836.
This application Nov. 13, 1987, Ser. No. 120,917
Int. Cl.[4] H04N 5/85
U.S. Cl. 358—335 **1 Claim**



1. A method of identifying and storing a plurality of video images in a plurality of selectable sequences for use in a video image reproducing apparatus in order to simulate movement within a multi-dimensional space,

said reproducing apparatus including video image storage means for retrievably storing said video images in addressable locations on a storage medium,

each of said video images being associated with an identifying number corresponding to one of said addressable locations,

said reproducing apparatus having an operable capability of jumping at least a predetermined number k of said addressable locations to access a subsequent addressable location within a predetermined time period t,

said reproducing apparatus being operative to reproduce any image within k addressable locations of a given image subsequent to reproducing said given image, comprising the steps of:

(1) arranging a plurality of images representing said multi-dimensional space into an array comprising a plurality of rows and columns of branches and a plurality of nodes, wherein:

each of said branches comprises a pair of sequences of images comprising a first sequence corresponding to movement in one direction along said branch and a second sequence corresponding to movement in the opposite direction along said branch,

each of said sequences beginning at one of said nodes and ending at an adjacent one of said nodes,

said rows and said columns intersecting at said nodes, and

the ending image of each one of said sequences ending at a given node being associated with the beginning image of a predetermined number b of said sequences beginning at said given node;

(2) selecting a base jump increment j less than k;

(3) assigning a progressively varying row first sequence identifying number to each of said images in each of said first sequences in each of said rows,

said row first sequence identifying numbers varying by j in one horizontal direction along each of said rows and varying by at least one least significant digit m between adjacent rows;

(4) assigning a progressively varying row second sequence identifying number to each of said images in each of said second sequences in each of said rows,

said row second sequence identifying numbers varying by j in the opposite horizontal direction along each of said rows and varying by one from the corresonding least significant digit m of said row;

(5) assigning a progressively varying column first sequence identifying number to each of said images in each of said first sequences in each of said columns,

said column first sequence identifying numbers varying along each of said columns connecting adjacent rows by incrementing by j for a first count, varying a predetermined number i for a second count, and then varying by decrementing by j for a third count;

(6) assigning a progressively varying column second sequence identifying number to each of said images in each of said second sequences in each of said columns,

said column second sequence identifying numbers varying along each of said columns connecting adjacent rows by incrementing by j for a first count, varying said predetermined number i for a second count, and then varying by decrementing by j for a third count; and

(7) the difference between the sequence identifying number at the end of each sequence ending at a given node and the sequence identifying number of each of said b sequences beginning at said given node always being less than k,

whereby said reproducing apparatus, after reproducing the last image of a given sequence ending at a given node can jump fewer than k addressable locations from said last

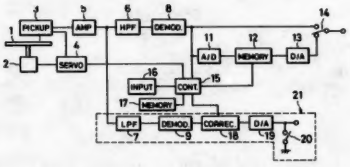
image of said given sequence ending at said given node to the beginning image of any one of said b sequences beginning at said given node within said time period t.

4,873,586

METHOD AND APPARATUS FOR REPRODUCING AUDIO AND VIDEO DATA FROM A DISK

Kazushige Ishikawa; Kenji Mochizuki; Toshihiro Maehara, and Masaharu Hagiri, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed May 6, 1988, Ser. No. 190,807
Claims priority, application Japan, May 8, 1987, 62-112944
Int. Cl.[4] G11B *7/00*
U.S. Cl. 358—342 **3 Claims**



1. A disk reproducing apparatus comprising:
input means for inputting numbers of a plurality of audio data to be reproduced in accordance with a desired sequence of reproduction;
a first memory for storing the numbers designated by said input means;
pickup means for reproducing data recorded on a disk and providing an output accordingly;
an audio circuit for separating and demodulating said audio data from the output of said pickup means;
a second memory for storing video data which is separated and demodulated from the output of said pickup means; and
a control circuit for controlling said pickup means, said second memory and said audio circuit in accordance with the data stored in said first memory;
wherein said control circuit instructs said pickup means to search for and retrieve video data corresponding to one of said plurality of audio data assigned to a first number among the plurality of numbers stored in said first memory, and to store the retrieved video data in said second memory; said control circuit then instructing a search of audio data corresponding to said first number, wherein, when the searched audio data is reproduced, the video data stored in said second memory is reproduced as a still picture image; and wherein the foregoing operations are carried out in sequence for each of said numbers stored in said first memory.

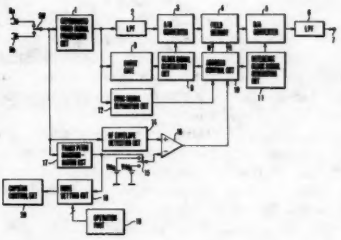
4,873,587

VIDEO SIGNAL REPRODUCING APPARATUS WITH MEMORY

Katsuji Yoshimura, Kanagawa; Susumu Kozuki, Tokyo; Hiroo Edakubo, and Chikara Sato, both of Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 25, 1987, Ser. No. 89,307
Claims priority, application Japan, Aug. 28, 1986, 61-200002
Int. Cl.[4] H04N *5/76, 5/782, 5/907*
U.S. Cl. 360—9.1 **15 Claims**

1. A video signal reproducing apparatus for reproducing a video signal from a record bearing medium on which many recording tracks are formed in parallel to each other comprising:
(a) a reproducing head which is arranged to trace the surface of the record bearing medium;
(b) memory means arranged to receive said video signals reproduced by said reproducing head and to store said video signal therein;
(c) tracking condition detection signal forming means which is arranged to form, by using the signal produced by said reproducing head, a tracking condition detection signal the level of which varies according to the tracking condition of said reproducing head;
(d) reference signal generating means for generating a reference signal which has a reference level;
(e) discriminating means arranged to discriminate a track pitch, at which said tracks are formed, by using signals reproduced by said reproducing head;



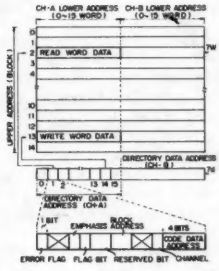
(f) comparison means for comparing the level of the tracking condition detection signal with that of said reference signal;
(g) control means arranged to control, on the basis of the signal output of said comparison means, whether or not said video signal is written into said memory means; and
(h) change-over means arranged to change a level relation between the tracking condition detection signal and said reference signal from one relation over to another on the basis of the output of said discriminating means.

4,873,588

APPARATUS FOR STORING DIGITAL DATA

Akihiko Hiramatsu, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Dec. 23, 1987, Ser. No. 137,344
Claims priority, application Japan, Dec. 23, 1986, 61-307186
Int. Cl.[4] G11B *5/09*
U.S. Cl. 360—47 **1 Claim**



1. An apparatus for storing digital data comprising:
data input means for receiving data blocks each including at least block address data for identifying the block, main data, and redundancy data forming an error detection or correction code, together with data including block address data for detecting the presence or absence of any error in th block address data;

error detecting means for detecting the presence or absence of any error in the block address data determined by use of the redundancy data and for producing an error detection signal when any error is detected in the block address data;

first write address generating means for generating first write address data;

first memory means for storing at least the main data among the data block according to the first write address data from said first write address generating means;

second write address generating means for generating second write address data;

second memory means for storing the first write address data from said first write address generating means according to the second write address data from said second write address generating means when the address data is determined to have no error by said error detecting means;

second read address generating means for generating second read address data, whereby the first write address data stored in said second memory means is read out according to the second read address data; and

first read address generating means for generating first read address data according to the first write address data read out from said second memory means, whereby the main data stored in said first memory means is read out according to the first read address data.

4,873,589
DATA RECORDER AND METHOD

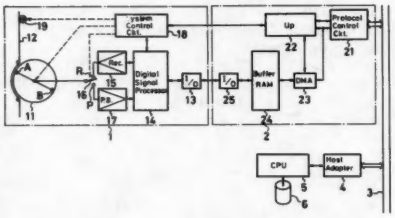
Yoshizumi Inazawa; Masaki Yamada; Hiroshi Ishibashi, and Shinya Ozaki, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 15, 1987, Ser. No. 133,010

Claims priority, application Japan, Dec. 19, 1986, 61-303080; Dec. 22, 1986, 61-305881; Dec. 24, 1986, 61-313856; Dec. 24, 1986, 61-313857; Dec. 25, 1986, 61-314922; Jan. 8, 1987, 62-2084; Jan. 12, 1987, 62-4434

Int. Cl.[4] G11B *5/09, 5/00*

U.S. Cl. 360—53 **11 Claims**



1. A digital data signal recorder comprising a rotary head means for recording the digital data signal on a part of a skewed track on a recording medium, means for transporting the recording medium past the rotary head means, means for detecting invalid data in the digital data signal, means controlled by the detecting means for recording in another part of said skewed track signal indicating that the data is invalid, and wherein the medium transporting means is controllable to have a normal recording speed mode and a high speed mode at which the recording medium is transported past the rotary head means at a rate much faster than the normal recording speed and further comprising means for recording on the recording medium, when a recording is ended, a predetermined end signal for a period having a duration which can be detected during the high speed mode, means for detecting a start position of said end signal at the next recording operation, and means for carrying out overwrite recording on the recording medium at said detected start position.

4,873,590
MAGNETIC RECORDING AND REPRODUCING APPARATUS

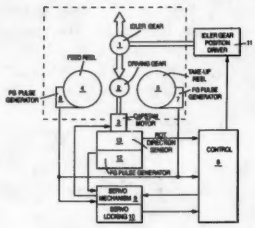
Tetsuo Ishiwata, Suita, and Katsuyuki Taguchi, Hirakata, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Feb. 29, 1988, Ser. No. 262,102

Claims priority, application Japan, Feb. 27, 1987, 62-45593

Int. Cl.[4] G11B *15/96*

U.S. Cl. 360—73.14 **2 Claims**



1. A magnetic recording and reproducing apparatus comprising:

a feed reel and a take-up reel which drive a hub of a cassette half;

a capstan motor for generating a driving force;

a driving gear driven by said capstan motor;

an idler gear which is selectively positioned in one of a first state and a second state, said first state being a position wherein said idler gear is in rotational contact with said driving gear, and said second state being a position wherein said idler is disengaged from said driving gear, and a means for selectively coupling said drive gear with said feed reel and take-up reel whereby said feed reel and said take-up reel rotate according to a rotation of said driving gear when said idler gear is in said first state;

a idler gear position driving means for shifting said idler gear between said first and second states;

a capstan FG pulse generating means for generating a capstan FG pulse according to a rotational speed of said capstan motor;

a feed reel FG pulse generating means for generating a feed reel FG pulse according to a rotational speed of side feed reel;

a take-up reel FG pulse generating means for generating a take-up reel FG pulse according to a rotational speed of said take-up reel;

a servomechanism means for controlling rotation of said capstan motor;

a servo locking detection means coupled to said capstan FG pulse generating means for detecting a servo locking of said servomechanism means when said capstan has attained a predetermined speed;

a capstan rotational direction detecting means for detecting a rotational direction of said capstan motor; and

a control means coupled to said idler gear position driving means, said feed reel FG pulse generating means, said take-up reel FG pulse generating means, said servomechanism means, said servo locking detecting means, and said capstan rotational direction detecting means, wherein said control means monitors said feed reel FG pulses and said take-up reel FG pulses to determine if said feed reel and said take-up reel are properly rotating when said idler gear is in said first state, and wherein said control means causes said idler gear position driving means to shift said idler gear from said first state to said second state and then back to said first state when said control means determines that at least one of said feed reel and said take-up reel are not rotating properly when said idler gear is in said first state.

4,873,591

TAPE LOADING DEVICE HAVING PAIR OF TAPE GUIDE POST UNITS ON PAIR OF ROTATABLE MEMBERS

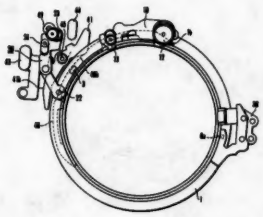
Takashi Kimura; Toshiya Yatomi, and Hiroo Edakubo, all of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 25, 1987, Ser. No. 89,136

Claims priority, application Japan, Aug. 28, 1986, 61-20214; Aug. 28, 1986, 61-202020; Aug. 28, 1986, 61-202021; Aug. 28, 1986, 61-202022; Aug. 28, 1986, 61-202023

Int. Cl.[4] G11B *15/665*

U.S. Cl. 360—85 7 Claims



1. A loading device for loading a tape-shaped record bearing medium onto a transducing member to carry out a transducing operation, comprising

(a) a first guide post unit including a guide post for guiding a tape-shaped recording medium;

(b) a second guide post unit including a guide post for guiding the tape-shaped medium;

(c) a first rotary member for moving said first guide post unit between a first unloading position where said first guide post unit is out of contact with said tape-shaped record bearing medium and a first loading position;

(d) a second rotary member for moving said second guide post unit between a second unloading position where said second guide post unit is out of contact with said tape-shaped recording medium and a second loading position, said tape-shaped recording medium being arranged to be loaded onto said transducing member to carry out said transducing operation when said first guide post unit is in said first loading position and said second guide post unit is in said second loading position;

(e) drive means for driving said first rotary member; and

(f) connection controlling means for controlling physical connection of said first rotary member with said second rotary member, said connection controlling means being arranged to physically connect said first rotary member with said second rotary member when said first guide post unit is positioned near said first unloading position and to release physical connection of said first rotary member with said second rotary member at least once during movement of said first guide post unit from said first unloading position to said first loading position.

4,873,592

PINCH ROLLER DRIVE ENGAGEMENT MECHANISM FOR A COMMUNICATIONS MONITOR AND LOGGER

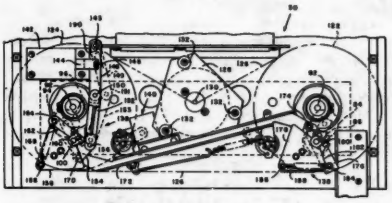
Paul G. Dulaff, Fairfield, and C. Eugene McGraw, Norwalk, both of Conn., assignors to Dictaphone Corporation, Stratford, Conn.

Filed Sep. 17, 1987, Ser. No. 97,905

Int. Cl.[4] G11B *15/00*

U.S. Cl. 360—90 5 Claims

1. In a communications-monitoring multi-channel magnetic tape recorder/reproducing device including a drive capstan, multi-channel recording and reproducing heads, means for rotating said drive capstan to move said tape across said heads, a pinch roller to urge said tape against said capstan with a pre-determined force, a solenoid having a plunger, a drive engagement mechanism comprising displaceable mounting means for mounting said pinch roller and to allow movement of said pinch roller towards and away from said capstan, a linkage connecting said pinch roller mounting means to said plunger so that said solenoid, acting through said linkage, moves said pinch roller from a retracted position to a contact position in which it contacts said capstan and urges said pinch roller against said capstan with said pre-determined force, said linkage including resilient bias means for applying a pre-determined force to said pinch roller in response to movement of



said solenoid plunger in a given direction, and disabling means for disabling said bias means and preventing it form applying force to said pinch roller until said pinch roller is closely adjacent said capstan; and further including a second drive capstan and second pinch roller and second drive engagement mechanism operative to engage said second pinch roller with said second drive capstan in functionally the same manner as the first-named drive engagement mechanism engages the first-named pinch roller and capstan with one another; and further including a coupling member drivably coupling said linkage of said drive engagement mechanisms to enable said solenoid to operate both of said mechanisms simultaneously.

4,873,593

MULTI-CASSETTE INDEXING MECHANISM FOR A TAPE TRANSPORT

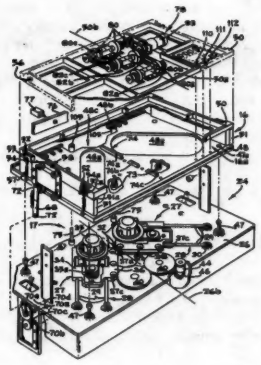
Antoni S. Baranski, San Carlos, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Division of Ser. No. 117,771, Nov. 5, 1987, Pat. No. 4,853,805.

This application May 10, 1989, Ser. No. 350,179

Int. Cl.[4] G11B *15/675*

U.S. Cl. 360—96.5 2 Claims



1. In a magnetic recording and reproducing apparatus, said apparatus having a turntable support assembly, an elevator

movable into engagement with the turntable support assembly, apparatus for aligning the elevator with the turntable support assembly to assure that a cassette inserted into the elevator for play would be delivered to a play position of the cassette support assembly, said apparatus comprising:

adjustable leveling members mounted on the turntable support assembly and supporting the elevator, said members individually movable to adjust the elevator to a final play position for the apparatus;

tape guide elements provided on a rear edge of the turntable support assembly;

alignment caps positioned to overlie the tape guide elements when the elevator is being aligned with respect to the turntable support assembly;

a cut-out portion of the bottom plate of the elevator engageable with the alignment caps to align the elevator front to rear with respect to the play position of the apparatus; and

adjusting means provided on the elevator for bringing the cut-out portion of the bottom plate into alignment with the alignment caps to position the elevator for play with respect to the turntable support assembly of the transport.

4,873,594

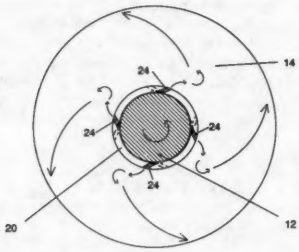
DISK SPACER RING HAVING AIR PUMPS

Tsu-Fang Chen, Eden Prairie, Minn., assignor to Magnetic Peripherals Inc., Minnetonka, Minn.

Filed Apr. 18, 1988, Ser. No. 182,675

Int. Cl.[4] G11B *5/02, 23/00*

U.S. Cl. 360—97.03 **6 Claims**



1. A disk spacer ring comprising:

a spacer ring having formed thereon at least one pair of intercommunicating fluid communicating channels,

a first channel outwardly diverging from one of the ring's radials in a first direction as the channel extends from a radially inner portion of the ring to an outer portion; and

a second channel outwardly diverging from said radial in a second direction opposite the first direction as the second channel extends from a radially inner portion of the ring to an outer portion such that the radial approximately bisects the angle between the two directions;

said first and second channels being in fluid communication with each other.

4,873,595

APPARATUS FOR POSITIONING A MAGNETIC DISK ON A DISK DRIVE

Katsuhiko Taguchi, and Kazuya Mitsumori, both of Chofu, Japan, assignors to JUKI Corporation, Japan

Filed Aug. 19, 1985, Ser. No. 767,090

Claims priority, application Japan, Aug. 23, 1985, 59-175784

Int. Cl.[4] G11B *5/012*

U.S. Cl. 360—99.05 **18 Claims**

1. Apparatus for positioning a magnetic disk upon a magnetic disk drive which includes a motor drive spindle and a turntable fixedly mounted upon said spindle, comprising:

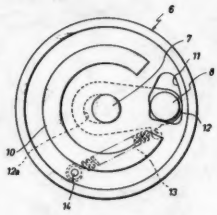
a driving pin;

means for biasingly mounting said driving pin upon said motor drive spindle so as to be movable in both radial and circumferential directions relative to said spindle and said turntable;

means defining a first hole within said magnetic disk within which said motor drive spindle is to be disposed;

means defining a second hole within said magnetic disk within which said driving pin is to be disposed;

means defining a third hold within said turntable for cooperating with said means defining said second hole within



said magnetic disk so as to confine said driving pin between said means defining said second hole within said magnetic disk and said means defining said third hole within said turntable whereby said magnetic disk will be properly positioned upon said magnetic disk drive; and

said means mounting said driving pin upon said spindle comprises a link plate having one end thereof rotatably disposed around said spindle and a spring having one end thereof connected to said turntable and the other end thereof fixed to said link plate which urges said driving pin to move said spindle.

4,873,596

MAGNETIC DISK DRIVE APPARATUS

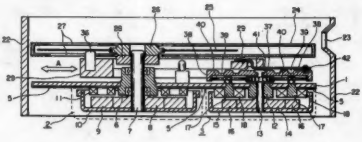
Tsutomu Harada, Tamana, and Yasushi Okamura, Yamaga, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 26, 1987, Ser. No. 112,163

Claims priority, application Japan, Oct. 27, 1986, 61-255080; Oct. 29, 1986, 61-257263

Int. Cl.[4] G11B *17/02, 5/016, 5/55, 21/08*

U.S. Cl. 360—99.11 **3 Claims**



1. An apparatus for driving a magnetic disk, comprising:

(a) a base plate made of magnetic metal;

(b) first and second motor shafts rotatably supported on the base plate;

(c) first and second rotors mounted on the first and second motor shafts respectively;

(d) first and second exciting coils fixed to the base plate and opposing the first and second rotors respectively;

(e) means for connecting the first motor shaft and the magnetic disk and allowing the magnetic disk to rotate in accordance with rotation of the first motor shaft;

(f) a carrier having a central opening through which the first motor shaft extends;

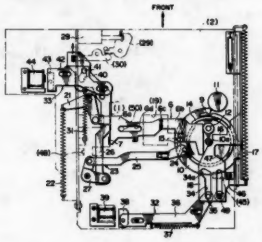
(g) a magnetic head mounted on the carrier and able to contact the magnetic disk;
(h) means for slidably supporting opposite sides of the carrier on the base plate;
(i) means for coupling the second motor shaft and the carrier and allowing the carrier to move linearly in accordance with rotation of the second motor shaft; and
printed wiring films extending on a surface of the base plate and provided with terminals, and electronic parts connected to the printed wiring films, the first and second exciting coils being fixed to the surface of the base plate and electrically connected to the terminals.

4,873,597

HEAD PLATE OPERATING MECHANISM FOR CASSETTE TAPE PLAYER

Ryousuke Hatanaka, Sayama, Japan, assignor to Nihon Technical Kabushiki Kaisha, Japan

Filed Feb. 9, 1987, Ser. No. 12,359
Claims priority, application Japan, Jun. 23, 1986, 61-144745
Int. Cl.[4] G11B *5/54*
U.S. Cl. 360—105 **9 Claims**



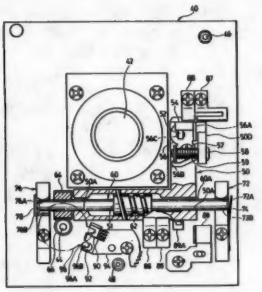
1. A head plate operating mechanism for a cassette tape player comprising:
a frame;
a head plate carrying magnetic head means and movably mounted on the frame for movement between non-play and play positions;
a transmission gear connected to be rotated when a tape cassette is loaded into the cassette tape player;
a notched gear engageable with the transmission gear and having gear teeth and a crank pin on a rotation surface thereof;
a starting mechanism for imparting a starting torque to the notched gear to rotate the notched gear so that a gear tooth adjacent to a notched portion of the notched gear approaches to and engages with the rotating transmission gear to thereby enable continued rotation of the notched gear by the rotating transmission gear, the starting mechanism being actuated when the tape cassette is loaded into the cassette tape player;
linkage means movably connected with the head plate and including a slide member slidably contactable with the crank pin of the notched gear to undergo displacement outwardly relative to the notched gear while the notched gear is being rotated by the rotating transmission gear, the slide member having means for releasing the head plate to allow movement of the head plate from the non-play position to the play position when the slide member has been moved by the crank pin;
first spring means for urging the slide member of the linkage means toward the notched gear, the biasing force of the first spring means being increased with displacement of the slide member by the crank pin;
first locking means for releasably locking the slide member in its position displaced by the crank pin;
controlling means for controlling the movement of the head plate between the non-play and play positions, the controlling means comprising a control member slidably contactable with the crank pin of the rotating notched gear so as to be moved outwardly relative to the notched gear by the crank pin after the slide member of the linkage means has been locked by the first locking means, and second spring means for resiliently connecting the control member and the head plate;
third spring means for urging the control member of the controlling means toward the notched gear, the biasing force of the third spring means being selected to allow the forced movement of the control member by the crank pin against the biasing force exerted by the third spring means; and
second locking means for releasably locking the starting mechanism in its actuated state after the starting mechanism has imparted the starting torque to the notched gear and for releasably restraining the notched gear from undergoing rotation after the control member has carried the head plate to the play position and the notched portion of the notched gear has rotated to a position to release the engagement between the notched gear and the transmission gear.

4,873,598

MECHANISM FOR SUPPORTING AND GUIDING A HEAD CARRIAGE

Kenji Negishi; Hidemi Sasaki, and Takeshi Fujishiro, all of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 27, 1988, Ser. No. 149,237
Claims priority, application Japan, Feb. 5, 1987, 62-25431; Feb. 5, 1987, 62-25432; Feb. 10, 1987, 62-30038; Feb. 10, 1987, 62-30039; Mar. 26, 1987, 62-73676
Int. Cl.[4] G11B *21/08, 5/55*
U.S. Cl. 360—106 **11 Claims**



1. A head carriage support mechanism comprising:
two bearings, each having two substantially perpendicularly intersecting surfaces in contact with opposite ends of a shaft of a lead screw, said lead screw having a threaded portion substantially in a center portion thereof;
a head carriage comprising: a needle engageable with said threaded portion of said lead screw; and
two substantially perpendicularly intersecting surfaces in contact with said lead screw shaft at two respective portions thereof adjacent opposite tends of said threaded portion, one of said two surfaces of said head carriage facing one of said two surfaces of each of said two bearings and a second one of said two surfaces of said head carriage facing a second one of said two surfaces of each of said two bearings; and,
at least one spring for energizing said head carriage so that said two surfaces of said head carriage as well as said two

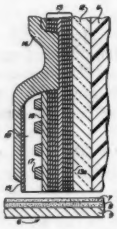
surfaces of said bearings, respectively, can be brought into contact with said shaft of said lead screw.

4,873,599

MAGNETIC HEAD ASSEMBLY FOR PERPENDICULAR MAGNETIC RECORDING

Kuniaki Sueoka, Kawasaki, Japan, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed May 10, 1988, Ser. No. 192,416
Claims priority, application Japan, May 15, 1987, 62-117267
Int. Cl.[4] G11B *5/147, 5/187, 5/23*
U.S. Cl. 360—126 **6 Claims**



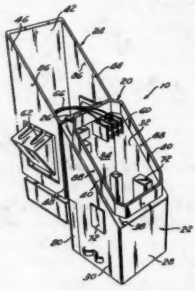
1. In a magnetic head assembly for perpendicular magnetic recording comprising a main magnetic pole, a coil magnetically connected to said main pole and an auxiliary pole placed on the same side of a magnetic medium as said main magnetic pole for forming a return path for a magnetic flux, the improvement wherein said auxiliary magnetic pole is formed of a magnetic material having the property that the permeability varies in the direction of relative movement between said magnetic head assembly and said magnetic medium with the permeability progressively increasing from each edge to the center of said auxiliary magnetic pole.

4,873,600

UTILITY PEDESTAL

Thomas A. Vogele, Newport Beach, Calif., assignor to Unicorn Electrical Products, Anaheim, Calif.

Filed Oct. 5, 1987, Ser. No. 104,106
Int. Cl.[4] H01R *9/00*
U.S. Cl. 361—426 **9 Claims**



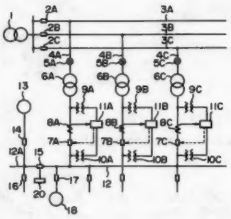
1. A utility station for mounting on a dock, comprising a generally vertically extending housing formed by a lower portion having an open upper end and an upper portion having an open lower end, said ends having edges which mate with each other to form an interface between said portions, said interface extending across said housing at an angle with respect to horizontal and creating a high side and a low side on the upper edge of said lower portion, structure for movably connecting said portions to permit said upper portion to be moved with respect to said lower portion from a closed position wherein the upper portion is vertically aligned on the lower portion and an open position wherein the upper portion is moved away from said lower portion to provide access to the upper end of the lower portion, an electric terminal block mounted on a wall of said lower portion near said upper end, said terminal block being connected to the high side of said lower portion, and said angle being such that the terminal block is above said low side, thus being readily accessible in a horizontal direction when said upper portion is in its open position, thereby enabling powerlines to be conveniently connected to said terminal block, an electrical outlet on said upper portion, and electrical wiring connecting said outlet to said terminal block, said wiring being sufficiently long not to restrict movement of said upper housing portion between said closed and opened positions.

4,873,601

SPOT NETWORK TYPE POWER RECEIVING AND TRANSFORMING PROTECTIVE APPARATUS

Fumio Wakasa, Kitaibaraki, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 17, 1988, Ser. No. 169,612
Claims priority, application Japan, Mar. 18, 1987, 62-60937
Int. Cl.[4] H02H *7/26*
U.S. Cl. 361—64 **14 Claims**



1. An apparatus for protecting a spot network type power receiving and transforming system, comprising:

(i) spot network protector means including:

a common bus connected to loads,

a plurality of branch buses connected to one end of said common bus and connected also to a plurality of power supply buses respectively,

series circuits of network transformers, current transformers and protector circuit breakers connected to said branch buses respectively, and

network relays connected in parallel with said series circuits of said current transformers and said protector circuit breakers respectively, said current transformers detecting reverse current flowing toward said power supply buses through said common bus, and said network relays operating in response to the detection of said current to trip said protector circuit breakers;

(ii) an electric generator connected to the other end of said common bus through a generator circuit breaker and operating in parallel with said spot network protector means; and

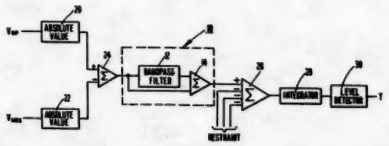
(iii) a link circuit breaker connected to said common bus between said spot network protector means and said electric generator, any one of said protector circuit breakers, said link circuit breaker and said generator circuit breaker being tripped under the condition that all of said circuit breakers and said network relays are in operation, thereby cutting off the path of current from said electric generator.

4,873,602

RIPPLE ATTENUATOR FOR AC POWER TRANSMISSION LINE PROTECTIVE RELAYS

Stanley B. Wilkinson, Havertown, Pa., assignor to General Electric Company, Malvern, Pa.

Filed Nov. 12, 1987, Ser. No. 120,079
Int. Cl.[4] H02H *3/16*
U.S. Cl. 361—78 14 Claims



1. A protective relay for detecting faults in a three phase alternating current electrical power distribution system, said relay comprising:

(a) means for generating an alternating current operate signal;

(b) means for rectifying said alternating current operate signal;

(c) means for removing at least one principal harmonic component from said rectified alternating current operate signal; and

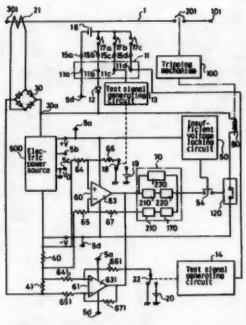
(d) energy comparison means, connected to receive said rectified alternating current operate signal with said at least one principal harmonic component removed, for generating a relay output signal as a function of the magnitude of the received operate signal.

4,873,603

CIRCUIT BREAKER

Kazuhiro Ishii, Fukuyama, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 23, 1989, Ser. No. 314,160
Claims priority, application Japan, Feb. 24, 1988, 63-41054
Int. Cl.[4] H02H *3/093*
U.S. Cl. 361—96 1 Claim



1. A circuit breaker comprising:

at least one current transformer for detecting current flowing on at least one A.C. power line;

at least one rectifying circuit for converting A.C. output of secondary winding of said current transformer to unidirectional current;

a series connection of an electric power circuit and at least one resistor connected between output terminals of the rectifying circuit, said resistor being for converting current flowing thereon to a voltage;

at least one differential amplifier for amplifying said voltage across both ends of said resistor;

at least one D.C. power source for outputting quasi input voltage;

at least one switch connected between said D.C. power source and said differential amplifier;

at least one test signal generating circuit for generating an output for controlling said switch on and off, to apply said quasi input voltage to said differential amplifier when the switch is turned on;

at least one connector having plural contacts for supplying D.C. voltage from external power source to said electric power circuit and said test signal generating circuit; and

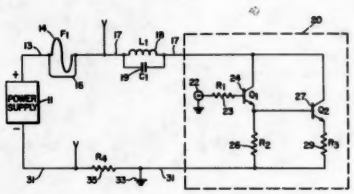
a reverse current preventing device connected between the electric power circuit and said contacts of said connector.

4,873,604

FUSES HAVING SUPPRESSED VOLTAGE TRANSIENTS

Harris A. Goldberg, Colonia, and Clyde C. Williams, Roselle, both of N.J., assignors to Hoechst Celanese Corp., Somerville, N.J.

Continuation-in-part of Ser. No. 487,401, Apr. 21, 1983, Pat. No. 4,642,664, and a continuation-in-part of Ser. No. 487,378, Apr. 21, 1983, Pat. No. 4,577,979. This application Jul. 1, 1985, Ser. No. 750,216
Int. Cl.[4] H02H *5/04*
U.S. Cl. 361—104 6 Claims



2. A shunt device which is used to protect electrical equipment when a fuse blows at a selected blowing voltage by minimizing the inductive spike which occurs when said fuse blows, said device comprising a by-pass across said fuse for permitting a limited amount of current to begin to flow at a lower voltage than said blowing voltage and before said fuse blows, thereby serving as a transitory relief valve for a portion of said current.

4,873,605

MAGNETIC TREATMENT OF FERROMAGNETIC MATERIALS

Vladimir Drits, Minnetonka, Minn., and Naum Tselesin, Atlanta, Ga., assignors to Innovex, Inc., Hopkins, Minn.

Continuation-in-part of Ser. No. 835,462, Mar. 3, 1986, abandoned. This application Jan. 9, 1987, Ser. No. 1,950
Int. Cl.[4] H01F *13/00;* H01H *47/00*
U.S. Cl. 361—143 26 Claims

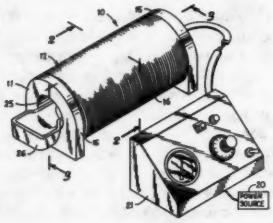
12. A treatment devise for increasing the effective service life of objects subjected to stress by stress equalization wherein the object is made of a material influenced by a magnetic field, comprising:

a coil having an open center core;

means for supporting an object to be treated in said open center of the core; and

power means for cycling current through said coil to provide a magnetic field in the vicinity of the object to be treated for a selected duration to reduce stresses in such object, said power means including power control means

for providing a sequence of applying current to the coil for periods ranging in time from substantially 15 to 50



seconds, in time related cycles, separated by a time pause of no current between each two cycles of current.

4,873,606

SAFETY CONTROL DEVICE FOR AN ACTUATOR OF THE FLAP SOLENOID VALVE TYPE

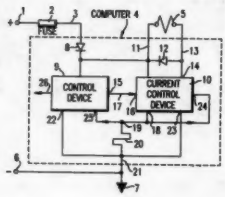
Gerard Pannier, Villiers-Saint-Frederic, France, assignor to Regie Nationale des Usines Renault, Boulogne Billancourt, France

Filed Jun. 22, 1988, Ser. No. 209,968

Claims priority, application France, Jun. 22, 1987, 87 08744

Int. Cl.[4] H01H *47/00*

U.S. Cl. 361—152 **7 Claims**



1. A safety control device for an actuator having a solenoid valve, comprising:

a current control device for controlling the current to said solenoid valve;

a shunt resistor connected to said current control device for measuring the current to said solenoid valve;

a control package connected to said current control device and said shunt resistor for measuring the time between the start of power to the solenoid valve and the moment when the current reaches a threshold intensity, said control package comparing said time with a time range $T_S \pm \Delta T$ which indicates the proper operation of the solenoid valve so that, if said time falls outside said time range, said control package controls said current control device to cut off power to said solenoid valve.

4,873,607

METHOD OF AND APPARATUS FOR CONTROLLING THE OPERTION OF ELECTROMAGNETIC SWITCHES

Kyohei Yamamoto, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 24, 1988, Ser. No. 159,717

Claims priority, application Japan, Feb. 25, 1987, 62-26984[U]; Feb. 25, 1987, 62-41848[U]

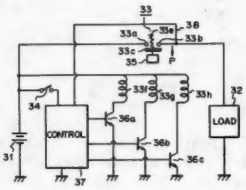
Int. Cl.[4] H01H *47/00*

U.S. Cl. 361—210 **6 Claims**

1. Electromagnetic switch apparatus for connecting a load device to a power source, said electromagnetic switch apparatus comprising:

a contact connected electrically in series between said load device and said power source, said contact having an open position in which said load device is not connected to said power source and said contact having a closed position in which said load device is connected to said power source;

means connected to said contact for moving said contact to said closed position, said moving means including a plural-



ity of exciting coils connected in parallel, said coils, when energized, generating a force to move said contact to said closed position;

energizing apparatus operable to energize each of said plurality of exciting coils sequentially so that the generated force is increased in steps until said contact is moved to said closed position; and

release apparatus responsive to said contact being moved to said closed position to de-energize at least one of said plurality of exciting coils.

4,873,608

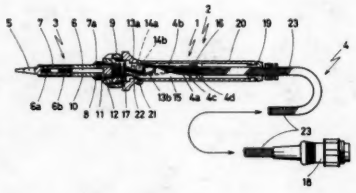
ELECTRIC SOLDERING IRON

Hiroshi Yoshimura, Osaka, Japan, assignor to Hakko Metal Industries Limited, Osaka, Japan

Filed Feb. 5, 1988, Ser. No. 152,891

Int. Cl.[4] H02H *5/22*

U.S. Cl. 361—220 **7 Claims**



1. In an electric soldering iron having a main body portion, a tip part to be heated by an electric heating means attached to a front end of the main body portion, the main body portion having a grip part, and a power cord for said electric heating means connected to the rear end of said main body portion, the main body portion including a conductive part disposed at least on the surface portion of said grip, and grounding wire means for this conductive part for electrically grounding the grip part:

the improvement comprising a conductive coating material formed on the surface of said power cord to cover the entire length thereof connected to electric ground for electrically grounding a sufficient portion of the power cord surface to prevent the power cord surface from becoming charged with static electricity.

4,873,609

PORTABLE ELECTRONIC UNIT FOR TREATMENT OF BITES BY POISONOUS SNAKES OR OTHER ANIMALS OR ALLERGIC CONTRAITS

Clifford R. Mackey, 2900 NE. Edgewater Dr., Claremore, Okla. 74017

Filed Jun. 20, 1988, Ser. No. 209,185
Int. Cl.[4] H05C *1/04;* F41B *15/04, 15/02*
U.S. Cl. 361—232 4 Claims

1. A portable self-contained medical unit for treatment of bites by poisonous snakes or other animals or allergic contacts which comprises:

a case;

an electrical battery within said case;

an electrical circuit within said case having an output and producing at its output a pulsating D.C. current at a voltage between about 15 KV and about 25 KV and at the rate of approximately twelve times per second;

a pair of outwardly extending electrodes carried by said case and connected to said output of said circuit;

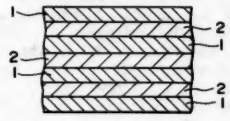
a hand operated switch for connecting said battery to said circuit.

4,873,610

DIELECTRIC ARTICLES AND CONDENSERS USING THE SAME

Akira Shimizu, Sagamihara, and Norio Kaneko, Atsugi, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 27,398, Mar. 18, 1987, abandoned. This application Jan. 31, 1989, Ser. No. 303,999
Claims priority, application Japan, Mar. 20, 1986, 61-63788
Int. Cl.[4] H01G *3/075, 4/10*
U.S. Cl. 361—313 16 Claims



9. A condenser having a pair of electrodes and a dielectric article sandwiched between said electrodes which article comprises a plurality of laminated repeating unit cells, each unit cell comprising at least two thin dielectric material layers, one of said layers having temperature characteristic of permittivity different from the other and wherein the thickness of each layer is 1000 Å or less but not less than of monatomic layer.

4,873,611

ELECTRICALLY INSULATING FLUIDS

William J. Greco, Jr., Forked River, N.J., assignor to Sybron Chemicals, Inc., Birmingham, N.J.

Continuation-in-part of Ser. No. 213,237, Jun. 29, 1988, abandoned. This application May 4, 1989, Ser. No. 347,061
Int. Cl.[4] H01G *4/22*
U.S. Cl. 361—315 4 Claims

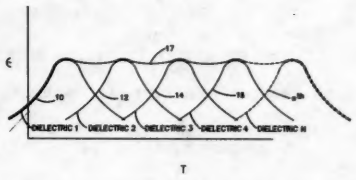
1. An electrical capacitor comprising a sealed casing having alternate layers of an electrically conductive material and a dielectric material disposed within the casing, and dielectric fluid impregnated into said dielectric material, said dielectric fluid consisting essentially of ditolylmethane.

4,873,612

TEMPERATURE STABLE MULTILAYER CAPACITOR

Jorge M. Hernandez, Mesa, Ariz., assignor to Rogers Corporation, Rogers, Conn.

Filed Aug. 1, 1988, Ser. No. 226,601
Int. Cl.[4] H01G *1/00;* C23B *5/50*
U.S. Cl. 361—321 24 Claims



1. In a multilayer capacitor including a plurality of layers of dielectric material having interleaved layers of electrodes with alternating electrodes layers being electrically connected to one of a pair of respective common terminations, the improvement comprising:

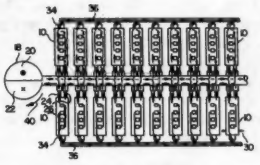
at least two of said plurality of layers of dielectric material being comprised of dielectric materials having differing Curie points wherein said at least two layers will have mutually distinct Curie points which are staggered over a preselected temperature range and wherein said at least two layers will form an effective temperature characteristic curve which is substantially constant over said preselected temperature range and wherein said at least two layers will have an effective dielectric constant which will be substantially equal to the dielectric constants at said Curie points.

4,873,613

COMPACT HIGH POWER MODULAR RF SEMI-CONDUCTOR SYSTEMS PACKAGING

Arthur H. Iversen, 15315 Sobey Rd., Saratoga, Calif. 95070

Filed Nov. 25, 1988, Ser. No. 276,025
Int. Cl.[4] H05K *7/20*
U.S. Cl. 361—385 1 Claim



1. A compact microwave solid state subsystem comprising a liquid coolant conduit incorporating side-by-side input and discharge conduits, said conduit attached at one end to a master coolant conduit; liquid cooled microwave semi-conductor device modules comprising input and output liquid coolant connectors at one end and RF output coupling means at the other end, said modules being mounted on two opposing surfaces of said liquid conduit there being multiple adjacent modules in close proximity to each other on each side, and along the length of said conduit, each module having input and discharge liquid couplers fastened respectively to corresponding input and discharge conduits of said conduit, there being RF coupling means mounted on the opposing ends of said module from said coolant connectors, said RF coupling means joining adjacent modules in such manner that the sum of the RF power output of all modules on each side of said conduit transmitted through successive couplers is additive and is

substantially equal to the power delivered from the last coupler into an output wave guide;

and, there being a number of RF subsystems set side by side, each having a coolant conduit coupled to said master coolant conduit, and, each module mounted on said coolant conduit having RF coupling means mounted on the opposing surface of said module, said RF coupling means additively joining adjacent modules and thence delivering the summed RF power into said output waveguide.

4,873,614

ARRANGEMENT OF A MODULE WITHIN A CASING FRAME

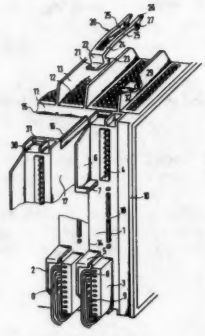
Ernst Lichtensperger, Kleiststrasse 10, 8057, Eching, Fed. Rep. of Germany

Filed Jun. 6, 1988, Ser. No. 202,455

Claims priority, application Fed. Rep. of Germany, Jun. 12, 1987, 3719689

Int. Cl.[4] H02B *1/04*

U.S. Cl. 361—394 **14 Claims**



1. In combination, a casing frame having removable modular electronic subassemblies inserted endwise therein in side-by-side relation, each said subassembly comprising a module having upper and lower edges, opposite side walls and a front wall, said front wall including at least one connector socket for receiving a plug of a cable harness and an L-shaped attachment projecting from said front wall adjacent said at least one connector socket, and fastener means for locking each said module within said casing frame, each said fastener means comprising a resilient lever removably and hingedly connected at one end to said casing frame, said lever being formed at its opposite end with a locking nose, and a recess in each said module for lockingly receiving said locking nose.

4,873,615

SEMICONDUCTOR CHIP CARRIER SYSTEM

Dimitry G. Grabbe, Middletown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 916,974, Oct. 9, 1986, abandoned. This application Sep. 23, 1987, Ser. No. 100,151

Int. Cl.[4] H04K *1/14*

U.S. Cl. 361—395 **6 Claims**

1. A semiconductor chip carrier system for use with a multiple chip carrier substrate, the system comprising:

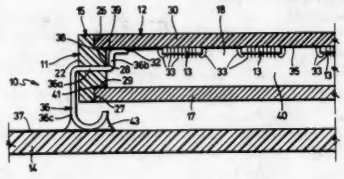
a frame of generally rectangular shape having a first major surface, a second major surface, and walls connecting the surfaces, the first major surface having a substrate receiving area;

the substrate, having a plurality of semiconductor chips mounted thereon, is positioned in the substrate receiving area and secured therein;

a plurality of electrical terminals extending through one or more walls of the frame, the terminals including a central portion embedded in the walls or walls, an outer compliant portion extending outside the frame and adapted to be electrically connected to external circuitry, and an inner compliant portion which is adapted to be electrically connected to a contact pad in electrical engagement with a semiconductor chip of the multiple chip carrier substrate;

cover means provided to protect the semiconductor chips from environmental harm;

a flexible interconnection member having conductors, mechanically fastened to the substrate at a plurality of sites to restrict lateral movement of the interconnection member



and associated conductors relative to the substrate while permitting the interconnection member and associated conductors and the substrate to flex and distort substantially independently of one another when subject to temperature variations; and

the frame being substantially non-rigid such that as the substrate expands and contracts according to temperature variation, the non-rigid frame allows the terminals to move accordingly, thereby eliminating the harmful stresses that will otherwise occur between the substrate and the terminals.

4,873,616

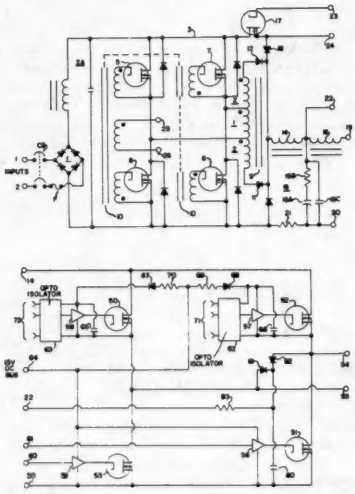
POWER SUPPLY FOR ARC LAMPS

William Fredrick, Valencia; Robert Brent, Saugus, and Peter Baldwin, Costa Mesa, all of Calif., assignors to Camera Platforms International, Inc., Valencia, Calif.

Continuation-in-part of Ser. No. 39,044, Apr. 16, 1987. This application May 21, 1987, Ser. No. 53,271

Int. Cl.[4] H02M *3/335*

U.S. Cl. 363—17 **6 Claims**



1. A power supply for an arc lamp, comprising:

(a) a DC converter having an input, an output, four electronic switches arranged in a bridge configuration, a transformer coupled to said electronic switches, a gate drive control circuit for controlling said electronic switches, said gate drive control circuitry alternatingly turning on opposing pairs of said electronic switches in said bridge configuration so as to reverse the direction of current flow through said transformer, rectifying means connected to said transformer and to said output of said DC converter, another electronic switch coupling the input of said DC converter to the output of said transformer and gate control means for controlling said another electronic switch so as to turn said another electronic switch on when the output voltage of said converter is greater than its input voltage;

(b) an output bridge coupled to the output of the DC converter for generating a square wave in response thereto for supply to said arc lamp at a normal operations voltage; and

(c) means for reigniting the arc lamp quickly after the lamp has become de-energized, said reigniting means including a capacitor coupled to said output and means for charging said capacitor to a voltage higher than the normal operating voltage of said arc lamp.

4,873,617

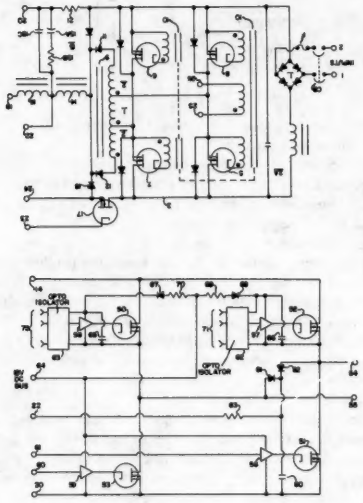
POWER SUPPLY FOR ARC LAMPS

William Fredrick, Valencia; Robert Brent, Saugus, and Peter Baldwain, Costa Mesa, all of Calif., assignors to Camera Platforms International, Inc., Valencia, Calif.

Continuation-in-part of Ser. No. 39,044, Apr. 16, 1987, and a continuation-in-part of Ser. No. 53,271, May 21, 1987. This application Aug. 10, 1987, Ser. No. 85,015

Int. Cl.[4] H02M *3/335*

U.S. Cl. 363—17 **13 Claims**



1. A power supply for an arc lamp, comprising:

(a) a DC converter having an input, an output, means for increasing the voltage received at the input and for applying increased voltage to said output, current sensing means for controlling the amount of current delivered to said output, a filter including a capacitor and an inductor, said filter being coupled to said output, the size of the capacitor being relatively large compared to the size of the inductor, whereby, upon re-ignition of the lamp, the inductor is sized such as not to unduly impede the transfer of charge then stored in the capacitor into the lamp; and

(b) an output H bridge coupled to the output of the DC converter for generating a square wave in response thereto, the output H bridge being coupled to said arc lamp.

4,873,618

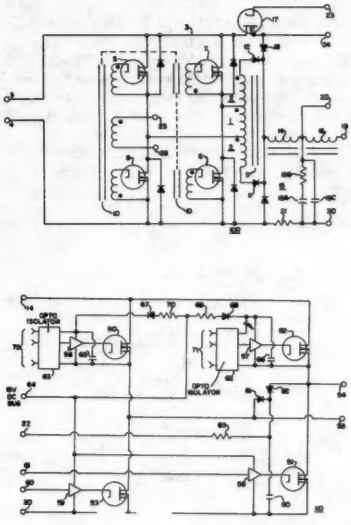
POWER SUPPLY FOR D.C. ARC LAMPS

William Fredrick, Valencia; Robert Brent, Saugus, and Peter Baldwin, Costa Mesa, all of Calif., assignors to Camera Platforms International, Inc., Valencia, Calif.

Continuation-in-part of Ser. No. 39,044, Apr. 16, 1987, and a continuation-in-part of Ser. No. 53,271, May 21, 1987, and a continuation-in-part of Ser. No. 85,015, Aug. 7, 1987. This application Dec. 3, 1987, Ser. No. 128,149

Int. Cl.[4] H02M *3/335*

U.S. Cl. 363—17 **21 Claims**



1. A power supply for an arc lamp, comprising:

a DC to DC converter having an input, an output, means for increasing the voltage received at the input and for supplying the increased voltage to said output; current sensing means for controlling the amount of current delivered to said output; an electronic switch coupling said input and said output; and switch control means responsive to the voltage of said input and at said output for controlling the state of said electronic switch depending upon the relative voltage levels of said input and output.

4,873,619

METHOD AND APPARATUS FOR CONTROLLING A STATIC CONVERTER AT AN ASYMETRICAL NETWORK

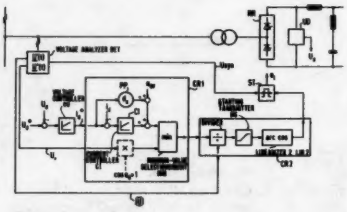
Elfriede Neupauer, Erlangen, Fed. Rep. of Germany, assignor to Siemens A.G., Munich, Fed. Rep. of Germany

Filed Nov. 9, 1988, Ser. No. 269,247

Claims priority, application Fed. Rep. of Germany, Nov. 12, 1987, 3738470

Int. Cl.[4] H02M *7/04, 7/68*

U.S. Cl. 363—51 **12 Claims**



1. A method for controlling with a predetermined control angle a converter that is coupled to a three-phase network and to a d-c circuit, comprising the steps of:

measuring an instantaneous asymmetry of the three-phase network; forming an asymmetry signal from the measured asymmetry; and modulating the control angle with said asymmetry signal.

4,873,620

VOLTAGE SUPPLY WITH RECOVERY PROTECTION FOR A THYRISTOR

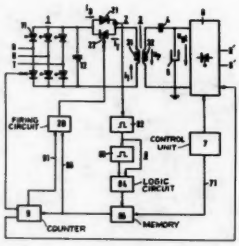
Franz Neulinger, Dietzenbach; Helmut Schummer, Heusenstamm; Gerhard Dönig, Erlangen, and Walter Schmidt, Uttenreuth, all of Fed. Rep. of Germany, assignors to Metallgesellschaft AG, Frankfurt am Main and Siemens AG, Munich, both of, Fed. Rep. of Germany

Filed Nov. 10, 1983, Ser. No. 550,616

Claims priority, application Fed. Rep. of Germany, Dec. 13, 1982, 3246057

Int. Cl.[4] H02H *7/122*

U.S. Cl. 363—57 **9 Claims**



1. In a voltage supply for an electric filter in which the electric filter is supplied with a high dc voltage from a first source of dc voltage, the supply including a transformer having a primary winding and a secondary winding, the secondary winding being coupled to the electric filter, a parallel connection of a thyristor and a diode connected in series with the primary winding and a second source of dc voltage, and a circuit coupled to the thyristor to supply periodic pulses thereto to periodically fire the thyristor and thereby trigger a resonant circuit which includes the transformer to produce a one period oscillation in the resonant circuit which is coupled to the filter by the transformer secondary winding, the improvement wherein the firing circuit comprises means for generating a firing pulse and supplying it to the thyristor when the duration of the current resulting from the one period oscillation flowing through the diode is shorter than the recovery time of the thyristor and means for preventing delivery of subsequent firing pulses from the firing circuit to the thyristor for a period of time depending on the state of the filter.

4,873,621

METHOD OF REGULATION AND REGULATING DEVICE FOR AN APPARATUS OR GROUP OF APPARATUSES, AS WELL AS AN APPARATUS HAVING A REGULATING DEVICE

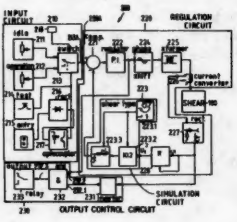
Beat De Coi, Sargans, and Hans-Peter Keller, Wagen, both of Switzerland, assignors to Gebrueder Loepfe AG, Wetzikon, Switzerland

Continuation of Ser. No. 624,268, Jun. 25, 1984, Pat. No. 4,700,289. This application Aug. 13, 1987, Ser. No. 84,870

Claims priority, application Switzerland, Jul. 1, 1983, 3630/83

Int. Cl.[4] G05B *13/04*

U.S. Cl. 364—150 **13 Claims**



13. A regulating device for regulating an apparatus or group of apparatuses, comprising:

an input circuit generating at least one predetermined reference value of an operating characteristic related to at least one predetermined state variable of said apparatus regulated by the regulating device;

a regulation circuit series connected with said input circuit and receiving therefrom said at least one predetermined reference value;

said regulation circuit being operatively connected with said apparatus regulated by the regulating device;

said regulation circuit containing a simulation circuit receiving data related to momentary values of said at least one predetermined stated variable of said apparatus regulated by the regulating device;

said simulation circuit producing, from said received data related to said momentary values of the at least one predetermined state variable, simulated values of said operating characteristic related to said at least one predetermined state variable and varying in accordance either a predetermined high-sloped branch of a preselected course of variation and which predetermined high-sloped branch leads to an operative state of the apparatus to be regulated;

said regulation circuit further containing a comparator circuit connected to said input circuit and said simulation circuit; and

said comparator circuit comparing said at least one predetermined reference value and said simulated values of said operating characteristic for regulating said apparatus.

4,873,622
LIQUID JET RECORDING HEAD

Hirokazu Komuro, Hiratsuka, and Masami Ikeda, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 77,090, Jul. 23, 1987, abandoned, which is a continuation of Ser. No. 740,494, Jun. 3, 1985, abandoned. This application Aug. 10, 1988, Ser. No. 230,718
Claims priority, application Japan, Jun. 11, 1984, 59-118333
Int. Cl.[4] G01D *15/18*; H05B *1/00*
U.S. Cl. 346—140 R **10 Claims**

1. A liquid jet recording head comprising:

a recording head unit including a support having an energy generator thereon and a cover attached to said support to form therewith a liquid chamber, wherein said cover has an orifice therein opposed to said energy generator for discharging liquid in said liquid chamber as flying droplets from said orifice by operating said energy generator;

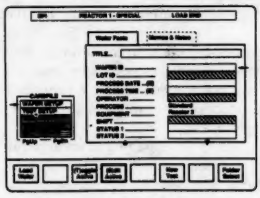
a substrate member comprising a frame having an external wiring unit including at least one connector for supplying an electrical signal to said energy generator; and

an electrical connection area, electrically connecting said energy generator and said external wiring unit, sealed by an insulative sealing material, wherein said recording head unit and said substrate member are molded into an integral unit by said sealing material and said connector extends externally of said integral unit.

4,873,623
PROCESS CONTROL INTERFACE WITH SIMULTANEOUSLY DISPLAYED THREE LEVEL DYNAMIC MENU

Leslie A. Lane, Santa Clara; Lynn V. Lybeck, Moss Beach; David S. Perloff, Sunnyvale, and Shoji Kumagi, Santa Clara, all of Calif., assignors to Prometrix Corporation, Santa Clara, Calif.

Continuation-in-part of Ser. No. 864,024, May 16, 1986, Pat. No. 4,805,089, which is a continuation-in-part of Ser. No. 729,153, Apr. 30, 1985, Pat. No. 4,679,137. This application May 15, 1987, Ser. No. 50,925
The portion of the term of this patent subsequent to Jul. 7, 2004, has been disclaimed.
Int. Cl.[4] G06F *15/46*
U.S. Cl. 364—188 **6 Claims**



1. A method of using a programmed digital computer having a display to provide values for a predefined set of parameters for use by a selected process:

establishing a set of processes which can be run under the control of said computer, each process having a predetermined set of process parameters which control said process;

selecting a process, from said set of established processes, to be run under the control of said computer, said selected process having a predefined set of process parameters which control said process;

concurrently displaying three menus in three distinct areas on the display;

establishing a pointer for each said menu for selecting an item in the corresponding menu;

displaying the item in each menu currently selected by the corresponding pointer so that a person viewing the display can identify said selected item;

listing: (a) in a first one of said menus, a multiplicity of set names, (b) in a second one of said menus, a set of subgroup names corresponding to the selected item in said first menu, and (c) in a third one of said menus, a predefined subset of said process parameters, said subset corresponding to the selected subgroup name in said second menu;

automatically responding to a position change of said pointer in said first menu by updating said second menu to display the subgroup names corresponding to the set name pointed to by said pointer in said first menu, and updating said third menu to display the subset of said parameters corresponding to the subgroup name pointed to by said pointer in said second menu;

automatically responding to a position change of said pointer in said second menu by updating said third menu to display the subset of said parameters corresponding to the subgroup name pointed to by said pointer in said second menu; and

providing interactive parameter entry means for entering parameter values for the parameter pointed to by said pointer in said third menu;

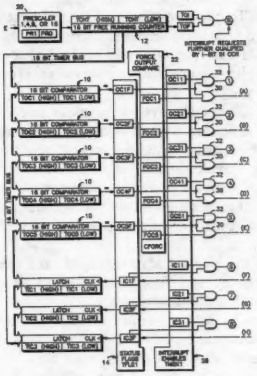
wherein said second and third menus together have the visual appearance of a set of indexes cards, said second menu forming tabs on the index cards, and said third menu forming the information listed on each index card;

whereby said process parameters are hierarchically organized into into sets and subsets.

4,873,624
OUTPUT COMPARE SYSTEM AND METHOD FOR A DATA PROCESSOR

James M. Sibigtroth, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 885,800, Jul. 14, 1986, abandoned, which is a continuation of Ser. No. 549,367, Nov. 4, 1983, abandoned. This application Oct. 20, 1988, Ser. No. 262,186
Int. Cl.[4] G06F *1/04*
U.S. Cl. 364—200 **2 Claims**



1. In a timer system comprising:

a counter for counting pulses of an input signal, and for providing a count value indicative thereof;

a compare register for storing therein, in response to a first control signal, a compare value provided thereto via a first bus; and

a comparator, coupled to the counter and to the compare register, for comparing the count value to the compare value, and for asserting a compare signal when said count and compare values are the same;

the improvement comprising:

a force register for storing therein, in response to a second control signal, a control bit provided thereto via a second bus, and for asserting a force signal when said stored control bit is set; and

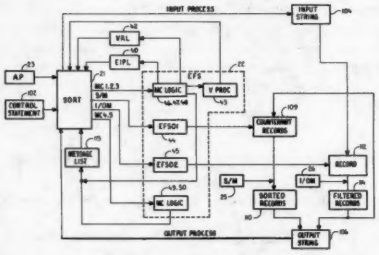
logic means, responsive to the compare signal and to the force signal, for producing an output signal in response to the assertion of either said compare signal or said force signal.

4,873,625

METHOD AND APPARATUS FOR EXTENDING COLLATION FUNCTIONS OF A SORTING PROGRAM

Gary D. Archer, Campbell, Calif.; Eugene G. Huff, Raleigh, N.C.; Miguel T. Madrid, Jr., San Jose, Calif., and Akio Yoshii, Tokyo, Japan, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 17, 1987, Ser. No. 121,465
Int. Cl.[4] G06F 7/00
U.S. Cl. 364—200 **12 Claims**



4. A method for concurrently executing a first (DFSORT) and a second (EFS) cooperating sequential process on a computing system, said first process being adapted to generate commands for forming an output string of records from an input string of first records having first collating characteristics in response to control statements executable by said first process upon said first records, said second process including a modality for altering control statements, said method comprising the steps of:

while said computing system is under control of said first process, inputting a set of control statements and an input string of records including second records with second collating characteristics, said set of control statements including a subset of control statements executable only on records including said second collating characteristics;

transferring control of said computing system to said second process;

modifying the control statements of said subset to a form executable by said first process upon records with said first collating characteristics;

in response to said modified control statements, concurrently executing said first and second processes upon said input file to filter said second records;

transferring control of said computing system to said first process; and

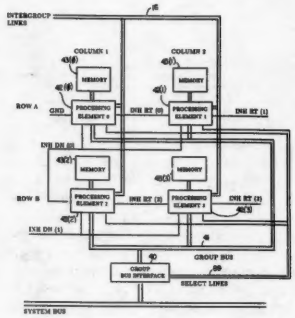
forming an output file including filtered second records.

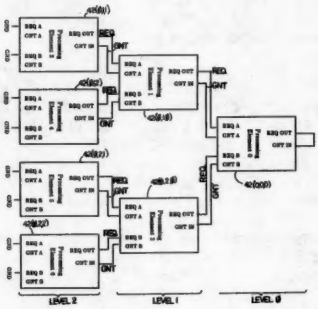
4,873,626

PARALLEL PROCESSING SYSTEM WITH PROCESSOR ARRAY HAVING MEMORY SYSTEM INCLUDED IN SYSTEM MEMORY

David K. Gifford, Cambridge, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Dec. 17, 1986, Ser. No. 943,314
Int. Cl.[4] G06F 7/00
U.S. Cl. 364—200 **6 Claims**





1. A digital data processing system comprising a plurality of processing elements divided into a plurality of processing element groups, all of said processing elements in a processing element group being connected to a group bus interface over a group bus, said group bus interfaces being interconnected by a system bus;

A. each said processing element including:

i. transfer request means connected to a transfer request line in said group bus for generating a transfer request signal when said processing element is to engage in a transfer over said group bus;

ii. arbitration means for engaging in an arbitration operation when said transfer request means generates said transfer request signal for controlling access of said processing element to said group bus;

iii. information transfer means connected to information lines in said bus for engaging in an information transfer operation; and

iv. control means connected to said arbitration means, said information transfer means and a grant line in said group bus for enabling said information transfer means to engage in an information transfer when said arbitration means indicates that said processing means has access to the group bus in response to the receipt of a grant signal over said grant line;

B. each said group bus interface including:

i. information coupling means for coupling information from said group bus information lines onto corresponding lines in said system bus; and

ii. system bus arbitration means connected to system bus arbitration lines, said information coupling means, said group bus request line and said group bus grant line for engaging in a system bus arbitration operation in response to the receipt of said request signal for controlling said information coupling means and generating the grant signal in response to the system bus arbitration operation.

4,873,627

METHOD AND MEANS FOR CONDITIONAL STORING OF DATA IN A REDUCED INSTRUCTION SET COMPUTER

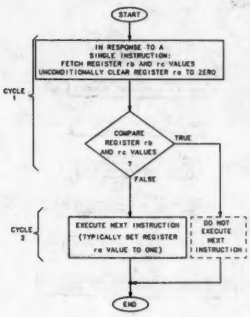
Allen J. Baum, Palo Alto; Terrence C. Miller, Menlo Park, and David A. Fotland, San Jose, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Division of Ser. No. 750,809, Jun. 28, 1985, Pat. No. 4,747,046. This application Dec. 30, 1987, Ser. No. 139,508

The portion of the term of this patent subsequent to May 24, 2005, has been disclaimed.

Int. Cl.[4] G06F *9/28*

U.S. Cl. 364—200 **4 Claims**


START
IN RESPONSE TO A SINGLE INSTRUCTION: FETCH REGISTER rb AND re VALUES UNCONDITIONALLY CLEAR REGISTER ra TO ZERO
CYCLE 1
COMPARE REGISTER rb AND re VALUES ?
TRUE
FALSE
CYCLE 2
EXECUTE NEXT INSTRUCTION (TYPICALLY SET REGISTER ra VALUE TO ONE)
DO NOT EXECUTE NEXT INSTRUCTION
END

1. A method for handling data conditionally in a computer device comprising the steps of:

receiving a single instruction; and

in response to said single instruction:

fetching and comparing in accordance with a selected condition two selected values from a first and a second register, respectively; and

clearing a third register unconditionally.

4,873,628

COMMAND TRANSLATING COMPUTER

Takuro Omori, Yamatokoriyama, and Shigenobu Yanagiuchi, Tenri, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 926,846, Nov. 3, 1986, abandoned, which is a continuation of Ser. No. 525,666, Aug. 23, 1983, abandoned. This application Apr. 18, 1988, Ser. No. 185,283

Claims priority, application Japan, Aug. 30, 1982, 57-151538

Int. Cl.[4] G06F *9/00*

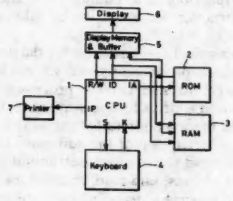
U.S. Cl. 364—200 **5 Claims**

1. A computer of a first type, comprising:

memory means, for storing control instructions, program instructions, commands and interpreter instructions;

said program instructions representing commands, each particular program instruction being executable by the computer of the first type or by a computer of a second type, a particular program instruction being executable by the computer of the first type to cause a first result, said particular program instruction being executable by the computer of the second type to cause a second result, said first and second results being different, said interpreter instructions specifying whether said particular program instruction in said memory means is to be interpreted as either a first command for the computer of the first type or a second command for the computer of the second type; and

program execution means, responsive to said control instructions from said memory means and said interpreter instructions, for performing operations under control of said control instructions and said interpreter instructions, including,



translation means, operatively connected to said memory means and responsive to said interpreter instructions, for translating said particular program instruction into a translated first command for the computer of the first type;

said translated first command for the computer of the first type commanding a result in the computer of the first type that is equivalent to said second result commanded by said second command of the computer of the second type.

4,873,629

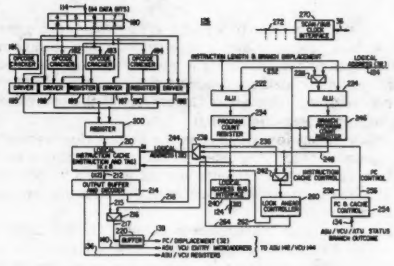
INSTRUCTION PROCESSING UNIT FOR COMPUTER

Michael C. Harris, Bedford; David M. Chastain, Plano, and Gary B. Gostin, Coppell, all of Tex., assignors to Convex Computer Corporation, Richardson, Tex.

Continuation of Ser. No. 622,728, Jun. 20, 1984, abandoned. This application Dec. 15, 1987, Ser. No. 133,195

Int. Cl.[4] G06F *9/26, 13/00*

U.S. Cl. 364—200 **5 Claims**



1. An instruction processing unit for use in a computer which has a main memory and a central processor wherein instructions for execution by the computer include a plurality of fields wherein at least one of the fields is an address field and the instructions are stored in the main memory, the instruction processing unit comprising:

means for decoding address fields of instructions received from said main memory to produce cracked instructions which have at least one non-decoded field therein,

an instruction cache for storing said cracked instructions,

means for decoding at least one of said non-decoded fields of said cracked instructions received from said instruction cache for producing a plurality of instruction execution commands with at least one of said commands supplied to said central processor for directing the execution of the decoded, cracked instruction,

a first logic unit connected to receive one of said commands and functioning to compute an address for a next sequential instruction for execution by said central processor,

means for storing the address for the next sequential instruction which address is produced by said first logic unit,

a second logic unit connected to receive one of said commands and functioning to compute a branch address for the next instruction for execution by said central processor,

means for storing the branch address for the next instruction, which address is produced by said second logic unit, and

means responsive to said central processor for selecting either the stored address for the next sequential instruction or the stored branch address for the next instruction and routing the selected one of the addresses to said instruction cache to read the cracked instruction therein having said selected address, said read, cracked instruction transferred to said means for decoding said cracked instruction.

4,873,630

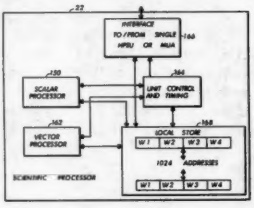
SCIENTIFIC PROCESSOR TO SUPPORT A HOST PROCESSOR REFERENCING COMMON MEMORY

John T. Rusterholz, Roseville; Archie E. Lahti, Fridley; Louis B. Bushard, Anoka; Larry L. Byers, Apple Valley; James R. Hamstra, Plymouth, and Charles J. Homan, St. Paul, all of Minn., assignors to Unisys Corporation, Blue Bell, Pa.

Filed Jul. 31, 1985, Ser. No. 761,201

Int. Cl.[4] G06F *15/347, 15/16*

U.S. Cl. 364—200 **26 Claims**



1. For use in a data processing system having a general purpose host processor and a high performance storage unit coupled thereto for providing a general purpose processing capabilities in said data processing system, an improved scientific processor operable under the control of the general purpose host processor comprising:

interface means for coupling to the high performance storage unit for receiving data operands and instruction words from the high performance storage unit and for transmitting resultant data operands to the high performance storage unit;

unit control and timing means coupled to said ,interface means for providing timing and control signals for synchronizing operation with the operation of the general purpose host processor and the high performance storage unit;

scalar processor module means coupled to said unit control and timing for performing scalar instruction data processing, said scalar processor module means including instruction buffer means for providing instruction word buffering between the high performance storage unit and the scientific processor; and

vector process module means coupled to said unit control and timing for performing vector data processing instructions, said vector processor module means including a plurality of pipeline means coupled to said interface means for receiving data transfers of said data operands therefrom and for providing resultant operands thereto, and further including a plurality of vector register means for temporarily storing selected ones of said data operands and said resultant operands;

wherein both scalar operands and vector operands can be efficiently manipulated in various combinations under program control of the general purpose host processor and to make resultant data operands available to the high performance storage unit all without the requirement of dedicated or cached memory.

4,873,631

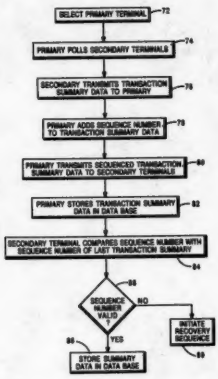
POINT OF SALE AUTOMATIC BACK-UP SYSTEM AND METHOD

Robert H. Nathan, and Lawrence A. Hislop, both of Atlanta, Ga., assignors to NCR Corporation, Dayton, Ohio

Filed Apr. 25, 1988, Ser. No. 185,590

Int. Cl.[4] G06F *15/21*

U.S. Cl. 364—405 **7 Claims**



1. A method for preventing the loss of data in a data processing system which includes a plurality of data terminal devices and in which each of the terminal devices is coupled to every other terminal device in the system comprising the steps of:

selecting one of the data terminal devices as a primary terminal device and the remaining terminal devices as secondary terminal devices;

transmitting a data message generated by one of the secondary terminal devices to the primary terminal device;

storing the data message generated by the secondary terminal device in a first storage unit in the primary terminal device;

transmitting the data message stored in the first storage unit to each of the secondary terminal devices in response to the storing of the data message in the first storage unit;

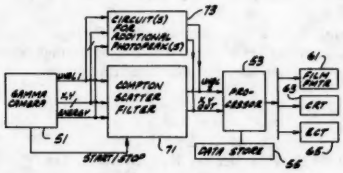
storing the data message transmitted by the primary terminal device in a second storage unit in each of the secondary terminal devices; and

transmitting the data stored in the first storage unit to a third storage unit in the primary terminal device after the data message has been transmitted to all of the secondary terminal devices.

4,873,632
APPARATUS AND METHODS FOR SCATTER REDUCTION IN RADIATION IMAGING

K. William Logan, and William D. McFarland, both of Boone County, Mo., assignors to The Curators of the University of Missouri, Columbia, Mo.

Continuation-in-part of Ser. No. 604,989, Apr. 27, 1984, Pat. No. 4,755,680. This application Jun. 1, 1987, Ser. No. 57,967
Int. Cl.[4] G01T 1/20
U.S. Cl. 364—413.13 82 Claims



1. Apparatus for use in reducing scatter in radiation imaging for use with a detector of ionizing radiation, where the ionizing radiation is partly unscattered and partly Compton scattered, the detector producing an energy signal representing values of energy of the ionizing radiation and producing coordinate position information for the ionizing radiation, and where the apparatus is for use with both data storage means for holding numerical values and with means for displaying an image based on the numerical values in the data storage means, the apparatus comprising:

means responsive to the energy signal from the detector for producing first and second signals which indicate whether each value of energy represented by the energy signal at a given time is in a first energy range or in a second energy range less than half as wide as the first energy range and having at least some energies in common with the first energy range; and

means responsive to the first and second signals and the coordinate position information for generating numerical values for each coordinate position and storing them in the data storage means, the numerical values being a function of the difference of the number of occurrences of ionizing radiation in the first energy range at each coordinate position less a second number proportional to the number of occurrences of ionizing radiation in the second energy range at that coordinate position.

4,873,633
USER CONTROLLED OFF-CENTER LIGHT ABSORBANCE READING ADJUSTER IN A LIQUID HANDLING AND REACTION SYSTEM

Mezei, Louis M., Fremont; Bradley S. Albom, Richmond; Coppock, Stan; Stephen J. Moehle, both of Berkeley; Brent S. Noorda, Pleasant Hill; Joseph T. Widunas, Berkeley, and James A. Zeitlin, Piedmont, all of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Continuation-in-part of Ser. No. 788,998, Oct. 18, 1985, abandoned. This application Sep. 11, 1986, Ser. No. 906,101
Int. Cl.[4] G01N 33/48, 21/01, 33/80, 35/02
U.S. Cl. 364—413.08 7 Claims

1. An apparatus for optimizing the accuracy of light absorbance readings taken by a plate reader regardless of the type of plate and type of well in said plate comprising:

means for causing the plate reader to take multiple light absorbance readings at different locations across the bottom of each well;

means for displaying the absorbance readings in graphical form to a user and for displaying the current locations of at least one off center absorbance reading used to discriminate positive reactions from negative reactions;

means for allowing the user to move the locations of the off center absorbance reading relative to the rest of the graphic display to optimize the discriminatory powers of the system to distinguish between positive and negative reactions; and

means to record the user's choice for the position of the off center reading for use in further plate reading operations.

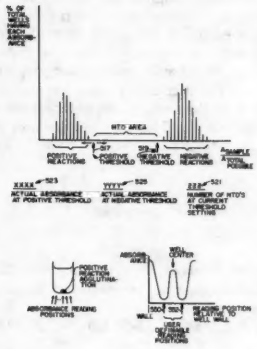
2. The apparatus of claim 1 wherein the means for graphically displaying the absorbance data and for allowing the user to move the position of the off center reading is a host computer and further comprising:

means for allowing the user to perform automated liquid handling on each different plate type using a sequence of liquid handling steps which is customized for that plate type;

means for reading a bar code on each plate type and for sending this data to said host system with tag data for plates which have predetermined liquid handling sequences, said tag data indicating that the plate has a well bottom geometry for which the plate reader system is not currently optimized;

means in said plate reader for reading the bar codes on plates placed therein for reading and for sending the bar code data to said host system;

means in said host system for looking up the bar code data received from the plate reader and determining whether the plate is a type for which the plate reader has not been optimized in position of the off center reading;



means for controlling the plate reader to cause said means for causing multiple absorbance readings to be taken to take said readings.

4. An apparatus for performing automated blood grouping on donor samples comprising:

a computer directed liquid handler means to perform predetermined automated sequences of operations involving placing aliquots of donor red blood cells and plasma into a plurality of wells in a plurality of assay trays and placing predetermined reagents in predetermined ones of said assay wells;

a computer directed plate reader to measure light absorbance data for the wells in said trays; and

a host computer for sending commands to control the operations of said plate reader and said liquid handler and for collecting, analyzing and storing the light absorbance data from said plate reader to determine the blood group and type of each donor's blood, said host computer also having means therein for allowing the user to define graphically the optimum position for shining light through the bottom of one of said assay wells to measure light absorbance so as to maximize the accuracy of the host computer in determining blood group and type including means to cause said plate reader to measure the light absorbance along a plurality of different paths through the bottom of

a well containing a positive reaction agglutination button and to send said data to said host computer and including means to display the light absorbance along said plurality of different light paths through said well as a graph of light absorbance versus steps off center of well bottom center for each said path and including means for graphically displaying the current position for at least one off well bottom center light absorbance reading used for measuring light absorbance in automated blood assay and for allowing the user to graphically alter the position at which this off well bottom center light absorbance reading is taken by moving the marker on the light absorbance graph.

5. The apparatus of claim 4 further comprising:

means in said liquid handler to read the bar codes of test tubes containing donor samples and the bar codes of trays into which the donor samples are deposited and for sending this data to the host computer for storage in a look up table and further comprising means for appending either a steps off center code or a histogram code to bar codes for trays whose light absorbance data is to be graphically displayed to the user;

means in said plate reader for detecting these histogram or steps off center codes and for sending same to said host computer along with light absorbance data from each well in each tray along with data labelling the light absorbance data for each well from each tray with identifying information locating the well and tray from which the data came; and

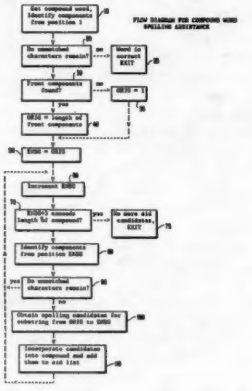
means in said host computer for storing and analyzing the data from the plate reader to determine the blood group and type of each user including means for processing the data from each well in which the same type reagent was placed into histogram format and for graphically displaying same to the user along with the absorbance values currently set as the positive and negative reaction discrimination thresholds and for allowing the user to graphically adjust the positions and absorbance values for said thresholds.

4,873,634

SPELLING ASSISTANCE METHOD FOR COMPOUND WORDS

Rudolf A. Frisch, Teaneck, N.J., and Antonio Zamora, Chevy Chase, Md., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 27, 1987, Ser. No. 30,793
Int. Cl.[4] G06F *15/40*
U.S. Cl. 364—419 **4 Claims**



1. In a computer system including input and output devices and a dictionary of terms each of which has a code indicating the way in which the term may be associated to form compound words, a process for isolating the unknown components of an input compound word which is misspelled or for which the dictionary of terms does not contain all of its components, comprising:

identifying all dictionary terms which have a code indicating that they can be initial substrings of compound words and which are initial substrings of said input compound word;

for each said initial substring, identifying in turn the remaining substring of the input compound word by retaining the portion of the compound word succeeding the initial substring;

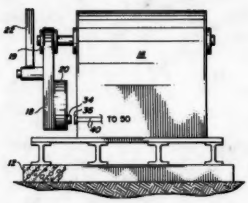
identifying the unknown components of the input compound word to be the set of said remaining substrings truncated at a point where any terminal substring starts.

4,873,635

PUMP-OFF CONTROL

Manual D. Mills, P.O. Drawer 1073, Midland, Tex. 79702

Filed Nov. 20, 1986, Ser. No. 932,846
Int. Cl.[4] F04B *49/00*
U.S. Cl. 364—422 **20 Claims**



1. In a pumpjack unit having a rod string connected thereto and extending downhole in a borehole and connected to reciprocate a downhole pump apparatus having a pump plunger and a barrel, said rod string being reciprocated by said pumpjack unit which is actuated by a prime mover, the method of shutting-in the well for a selected length of time when the pump apparatus encounters a pumped-off condition of operation, comprising the steps of:

(1) measuring successive time intervals for the pump to downstroke with a full pump barrel;

(2) measuring successive time intervals for the pump to downstroke when the pump apparatus approaches a pump-off condition and the pump barrel is progressively less than full;

(3) measuring the time differential between steps (1) and (2) and using the resultant differential measurement to provide a series of pump-off signals;

(4) selecting one of the series of pump-off signals in step (3) which is of a magnitude that is representative of the occurrence of an undesirable pump-off condition;

(5) using the selected pump-off signal of step (4) to de-energize the prime mover and thereby discontinue the pumping action for a selected time interval.

4,873,636

INTERPRETATION OF CONICAL STRUCTURES FROM DIPMETER SURVEYS

Vincent R. Hepp, Houston, Tex., assignor to Amoco Corporation, Chicago, Ill.

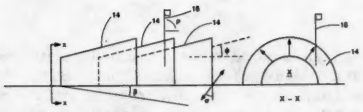
Filed Oct. 26, 1987, Ser. No. 113,844
Int. Cl.[4] G01V *3/18*
U.S. Cl. 364—422 **9 Claims**

1. A method of assisting in the determination of the existence of conical folding of a geological formation utilizing an exist-

ing dipmeter survey obtained through a wellbore penetrating the geological formation, comprising:

(a) obtaining estimates of plunge and aperture of the geological formation, and position of the wellbore with respect to the geological formation;

(b) utilizing the estimates, generating a synthetic dip plot representative of conical folding;



(c) adjusting the value of one or more of the estimates to obtain a final synthetic dip plot that has the highest correlation of the dipmeter survey, thereby providing an assistance in the determination of the existence of conical folding of the geological formation.

4,873,637

CONTROL FOR VEHICLE START FROM STOP OPERATION

Eugene R. Braun, Royal Oak, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Feb. 10, 1988, Ser. No. 154,562

Int. Cl.[4] B60K *41/02, 41/18*

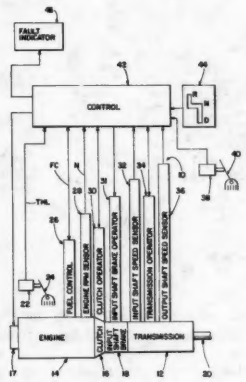
U.S. Cl. 364—424.1 **27 Claims**

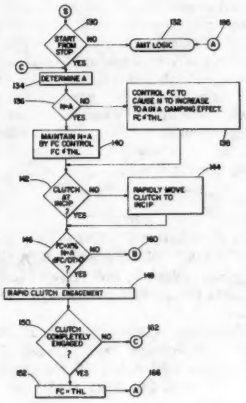
1. A method for controlling a vehicle automatic start from stop system for vehicles having an operator actuated throttle pedal, a fuel control (**26**) for controlling the amount of fuel supplied to the engine, a transmission having a plurality of gear ratio combinations selectively engagable between a transmission input shaft and a transmission output shaft, said transmission input shaft being operatively connected to said engine by means of a selectively engagable and disengagable friction clutch, said automatic start from stop system comprising an information processing unit having means for receiving a plurality of input signals including (1) and input signal (N) indicative of the rotational speed of the engine; and (2) an input signal (THL) indicative of the operator setting of the throttle pedal or of a function of the amount of fuel supplied to the engine, said processing unit including means for processing said input signals in accordance with predetermined logic rules for generating command output signals whereby said system is operated in accordance with said logic rules, and means (**26, 30, 34**) associated with said system effective to actuate said clutch (**16**) and said fuel control (**26**) in response to said command output signals from said processing unit;

said processing unit having means to sense vehicle start from stop operation and, in a vehicle start from stop operation,, issuing command output signals to said clutch control means for automatically controlling the rate of engagement of said clutch and to said fuel control means for automatically controlling the amount of fuel supplied to said engine; the method comprising:

setting a target engine speed value (A);

modulating the amount of fuel supplied to the engine to cause the engine speed to rapidly, in a damped manner, substantially equal said target engine speed and then modulating the amount of fuel to said engine to cause said engine speed to be maintained at substantially said target engine speed value; and





at initiation of vehicle start from stop operation causing said clutch to engage at a first rate of engagement if the amount of fuel currently supplied to said engine is less than a first predetermined value and causing the clutch to be maintained at its current state of engagement if the amount of fuel currently supplied to the engine is equal to or greater than said first predetermined value.

4,873,638

TRACTION CONTROL SYSTEM FOR CONTROLLING SLIP OF A DRIVING WHEEL OF A VEHICLE

Shuji Shiraishi, and Takashi Nishihara, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

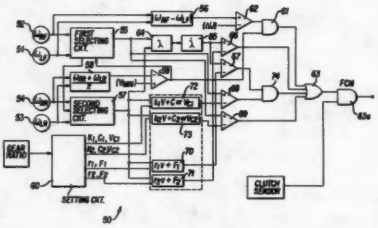
Filed May 11, 1987, Ser. No. 48,424

Claims priority, application Japan, May 9, 1986, 61-107240; May 9, 1986, 61-107241; May 9, 1986, 61-107242; May 9, 1986, 61-107243; May 9, 1986, 61-107244

The portion of the term of this patent subsequent to Oct. 10, 2006, has been disclaimed.

Int. Cl.[4] B60T *8/58*

U.S. Cl. 364—426.01 **45 Claims**



1. A control system for controlling the slip of a driving wheel of a vehicle having at least two driving wheels, said system comprising:

a driving wheel speed sensor means for sensing the speed of said driving wheels and for generating a driving wheel speed signal as a function thereof;

a vehicle speed sensor means for sensing the speed of said vehicle and for generating a vehicle speed signal as a function thereof;

a first selecting circuit means, included within said driving wheel speed sensor means and operatively connected to said vehicle speed sensor means, for selecting the speed of only one of said driving wheels, on opposing sides of the vehicle, as said driving wheel speed signal, such that when the vehicle speed is below a predetermined value, said first selecting means selects the speed of the slower of said driving wheels as said driving wheel speed signal, and

control means responsive to said driving wheel speed signal from said first selecting circuit means for controlling the slip of said driving wheel.

4,873,639

TRACTION CONTROL SYSTEM FOR CONTROLLING SLIP OF A DRIVING WHEEL OF A VEHICLE

Makoto Sato; Shuji Shiraishi, and Tetsuji Muto, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 4, 1987, Ser. No. 21,892

Claims priority, application Japan, Mar. 4, 1986, 61-46948; Mar. 4, 1986, 61-46949; Mar. 4, 1986, 61-46950

Int. Cl.[4] B60T *8/58*

U.S. Cl. 364—426.02 **33 Claims**

1. A control system for controlling the slip of a driving wheel of a vehicle, said system comprising:

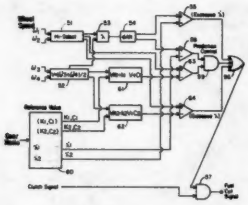
driving wheel speed sensor means for sensing the speed of a driving wheel and for generating a driving wheel speed signal as a function thereof;

vehicle speed sensor means for sensing the speed of the vehicle and for generating a vehicle speed signal as a function thereof;

slip rate calculating means, operatively coupled to said driving wheel speed sensor means and said vehicle speed sensor means, for calculating a slip rate (λ) of said driving wheel with respect to the movement of said vehicle;

differentiating means, coupled to said slip rate calculating means, for calculating the differential value (λ·) of said slip rate;

means for generating a gear ratio signal;



output means, coupled to said differentiating means and said gear ratio signal generating means, for providing a driving wheel slip control signal in response to said differential value (λ·) of said slip rate and said gear ratio signal.

4,873,640

DRIVING-SPEED ADJUSTING ARRANGEMENT

Peter Bürk, Reuchen-Ulm, and Klaus Hahn, Bühlertal, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

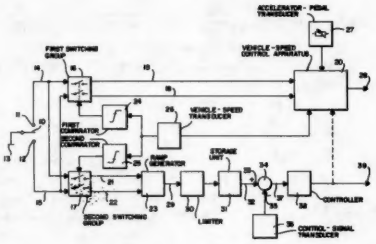
PCT No. PCT/DE87/00018, § 371 Date Dec. 21, 1987, § 102(e) Date Dec. 21, 1987, PCT Pub. No. WO87/06200, PCT Pub. Date Oct. 22, 1987

PCT Filed Jan. 15, 1987, Ser. No. 143,130

Claims priority, application Fed. Rep. of Germany, Apr. 19, 1986, 3613322

Int. Cl.[4] B60K *31/00*

U.S. Cl. 364—426.04 **12 Claims**



1. A vehicle-speed adjusting arrangement comprising:

a switching unit including: first and second switching contacts for controlling an increase and a decrease in the vehicle-speed desired value, respectively; and, selector switching means movable between two positions for selectively connecting one of said contacts to a neutral position;

a vehicle-speed control apparatus for controlling the speed of the vehicle in response to the position of said selector switching means;

transducer means for providing an electrical speed signal indicative of the actual speed of the vehicle;

first switching means movable between a first condition wherein said switching contacts are disconnected from said control apparatus and a second condition wherein said switching contacts are connected to said control apparatus;

ancillary function means for performing an ancillary function in the motor vehicle;

second switching means movable between a first situation

wherein at least one of said switching contacts is disconnected from said ancillary function means and a second situation wherein said one switching contact is connected to said ancillary function means;

comparator means for setting a threshold vehicle speed and being responsive to said speed signal for acutating said first switching means to move the first switching means from said second condition thereof into said first condition when said vehicle speed drops below said threshold vehicle speed and for actuating said second switching means to move the second switching means from said first situation thereof into said second situation thereof also when said vehicle speed drops below said threshold vehicle speed thereby permitting said one switching contact to serve to control said ancillary function means.

4,873,641

INDUCTION VOLUME SENSING ARRANGEMENT FOR AN INTERNAL COMBUSTION ENGINE OR THE LIKE

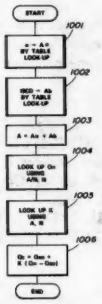
Hatsuo Nagaishi, Zushi; Yasuo Seimiya, Fujisawa; Hideyuki Tamura, Yokohama; Hiromichi Miwa, Yokohama; Hiroshi Sanbuichi, Yokohama; Masaaki Uchida, Yokohama, and Toshio Takahata, Yokohama, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Jul. 1, 1987, Ser. No. 68,942

Claims priority, application Japan, Jul. 3, 1986, 61-156837; Jul. 25, 1986, 61-174997; Jul. 29, 1986, 61-177949

Int. Cl.[4] F02M *17/00*

U.S. Cl. 364—431.04 **27 Claims**



1. A method of operating an internal combustion engine comprising the steps of:

sensing a first engine operational parameter which indicates the load on the engine;

sensing a second engine operational parameter which indicates the rotational speed of the engine;

recording a first set of data in a memory means, said first set of data defining a first two dimensional map which is recorded in terms of said first engine operational parameter and a first variable which varies with the degree by which air flow to said engine is restricted;

deriving a value of said first variable by comparing the value of said first engine operational parameter with said first set of recorded data;

modifying said first variable using the value of said second engine operational parameter to derive a second variable;

recording a second set of data in said memory means, said second set of data defining a second two dimensional map, said second set of data being recorded in terms of said second variable, said second engine operational parameter and a third variable which is indicative of an amount of air being inducted into said engine; and

comparing the values of said second variable and said first parameter with said second set of recorded data to obtain a value of said third variable.

4,873,642

METHOD FOR CONTROLLING AN OXYGEN CONCENTRATION SENSOR FOR USE IN AN AIR/FUEL RATIO CONTROL SYSTEM OF AN INTERNAL COMBUSTION ENGINE

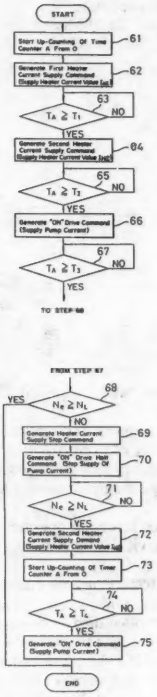
Toshiyuki Mieno; Toyohei Nakajima; Yasushi Okada, and Nobuyuki Oono, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 4, 1987, Ser. No. 21,704

Claims priority, application Japan, Mar. 4, 1986, 61-47547

Int. Cl.[4] F02M *51/00, 7/00*

U.S. Cl. 364—431.06 **4 Claims**



1. A method for controlling an oxygen concentration sensor to be used in an internal combustion engine having an ignition switch and an exhaust gas passage, the oxygen concentration sensor having a sensor body forming a gas retaining space which communicates with an inside of the exhaust gas passage through a gas diffusion restriction region and which includes a wall of an oxygen ion conductive solid electrolyte member, the oxygen concentration sensor further having two pairs of electrodes so that each pair is disposed on opposing sides of the wall of the oxygen ion conductive solid electrolyte member and a current source for supplying a current in response to a difference between a voltage developed across one pair of electrodes of the two pairs of electrodes and a reference voltage, the current being supplied to the other pair electrodes of the two pairs of electrodes, the oxygen concentration sensor also having a heater element for generating heat for heating the wall of the oxygen ion conductive solid electrolyte member in accordance with the amount of a heater current supplied thereto, the method comprising the steps of:

measuring time lapsed after the ignition switch of the internal combustion engine is turned on; and

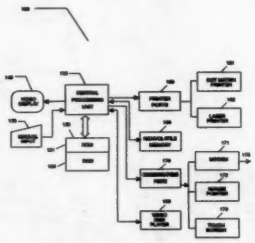
controlling a first current value of the heater current, during a first predetermined time period after the ignition switch is turned on, said first current value being smaller than a second current value of the heater current, said second current value being the heater current which is supplied to the heater element after a lapse of said first predetermined time period.

4,873,643

INTERACTIVE DESIGN TERMINAL FOR CUSTOM IMPRINTED ARTICLES

Kenneth A. Powell, Ann Arbor, Mich., and Andrew S. Crawford, 523 Sunset, Ann Arbor, Mich. 48103, assignors to Andrew S. Crawford, Ann Arbor, Mich.

Filed Oct. 22, 1987, Ser. No. 111,412
Int. Cl.[4] G06F *15/46*
U.S. Cl. 364—468 **18 Claims**



18. An interactive design terminal for custom imprinted articles comprising:

a design element memory having stored therein data representing a plurality of print design ellements;

a desiga rules memory having stored therein a plurality of design rules regarding placement and size of print design elements;

an input device for receiving operator inputs;

a video display device for generating an operator perceivable display;

an interactive interface means connected to said design element memory, said design rules memory, said input device and said video display device for

presenting choices to an operator via said video display means concerning the permitted selection of print design elements and print design element locations in accordance with said design rules stored in said design rule memory,

receiving selections from an operator via said input device, and

displaying to an operator via said video display means a pictorial display of said selections of print design elements and print design element locations, whereby the operator can view said display of said selections and edit said selections via said input device.

4,873,644

GUIDE SYSTEM FOR A WORKING MACHINE HAVING A PRODUCT IDENTIFYING SYSTEM

Yasuo Fujii, Sakai, and Masahiko Hayashi, Toyonaka, both of Japan, assignors to Kubota, Ltd., Osaka, Japan

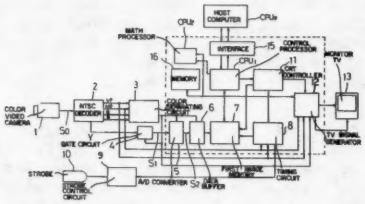
Filed Sep. 16, 1987, Ser. No. 97,565
Int. Cl.[4] A01D *46/24*; G05D *1/12*
U.S. Cl. 364—478 **14 Claims**

1. A guide apparatus for a product handling machine comprising:

a product identifying device including illuminating and detecting means for illuminating the product and detecting a geometric characteristic points in a region corresponding only to a color of the product;

a variable density image data selecting means for selecting a variable density image data of a range corresponding to a particular color selected from the image data obtained under illumination by the illuminating means;

peak luminance position detecting means for detecting a luminance peak position from the variable density image data;



a working hand including a proximity sensor for detecting that the working hand is within a predetermined distance from the product;

guide means for guiding said working hand to move toward said geometric characteristic point until said proximity sensor operates and thereafter to move said working hand toward the luminance peak position of a piece of the product; and

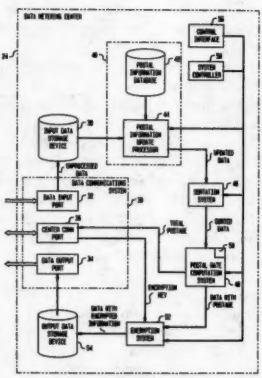
said geometric characteristic point is directed to a center of the product in a region of said product corresponding only to the color of the product.

4,873,645

SECURE POSTAGE DISPENSING SYSTEM

Kevin D. Hunter, Stratford; Robert T. Durst, Jr., Monroe, and Jose Pastor, Westport, all of Conn., assignors to Pitney Bowes, Inc., Stamford, Conn.

Filed Dec. 18, 1987, Ser. No. 134,671
Int. Cl.[4] G06F *15/20*; H04L *9/00*
U.S. Cl. 364—479 **17 Claims**



1. A secure postage dispensing system, said system comprises:

means for receiving mailing information; said mailing information including a list of addresses, said list of addresses being associated with a number of mail pieces to be sent,

and information indicative of the postage due for said mail pieces;

means for calculating the total postage required for said mail pieces;

means for establishing communication with a funds control center, said funds control center being adapted to receive said total postage and the total number of mail pieces to be mailed, said funds control center including means for effecting a funds transfer in the amount of said total postage to a carrier service and, upon completion of said funds transfer, returning a cryptographic key and a batch identifier;

means, using said cryptographic key, for providing a unique encrypted number for each address in said list of addresses; and

means for outputting said list of addresses, each said address having said unique encrypted number appended thereto.

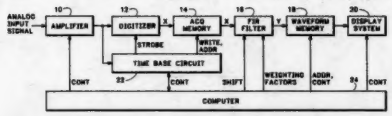
4,873,646
DIGITAL CORRECTION OF LINEAR SYSTEM DISTORTION

John F. Stoops, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Continuation-in-part of Ser. No. 755,022, Jul. 15, 1985, abandoned. This application Jan. 4, 1988, Ser. No. 140,703

Int. Cl.[4] G06F *15/353*; G01R *13/20*

U.S. Cl. 364—487 **11 Claims**



1. An oscilloscope for displaying a waveform representing a sequence of magnitudes related to a sequence of magnitudes of an analog input signal during a period of interest in accordance with a predetermined response characteristic, the oscilloscope comprising:

a linear system for producing an analog output signal in response to the analog input signal, the analog output and input signals differing but being related in accordance with a first response characteristic of the linear system;

digitizer means for periodically digitizing the output signal to produce a first data sequence having at least $M+N-1$ elements, where in at east $N-1$ elements of the first data sequence represent magnitudes of the analog output signal preceeding the period of interest, and wherein M elements of the first data sequence represent magnitudes of the analog output signal during the period of interest, M and N being integers greater than 1;

a digital filter for producing an output second data sequence wherein each element of the second data sequence corresponds to an element of the first data sequence, the digital filter having a second response characteristic such that each element of the second data sequence corresponding to an element of the first data sequence representing a magnitude of the analog output signal during the period of interest is a linear combination of its corresponding first data sequence element and $N-1$ preceeding data elements of the first data sequence;

means for generating a third data sequence consisting of the elements of the second data sequence corresponding to the M elements of the first data sequence representing magnitudes of the analog output signal during the period of interest; and

display means for displaying a waveform representing the elements of said third data sequence.

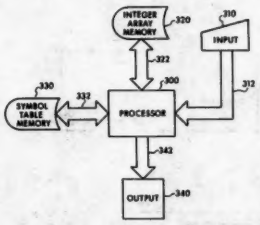
4,873,647
DIGITAL WAVEFORM ANALYZER

Mehrdad Banki; Kevin M. Bush, and William O. McDermith, all of Colorado Springs, Colo., assignors to Minc Incorporated, Colorado Springs, Colo.

Filed Jan. 11, 1988, Ser. No. 142,652

Int. Cl.[4] G06F *15/60*; G06G *7/48*

U.S. Cl. 364—488 **15 Claims**



1. An automated waveform analysis method for designing, on a computer, a logic implementation of an interface circuit connected between at least one first digital device and at least one second digital device from inputted data to said computer, said inputted data being an input and output waveforms from said first and second digital devices to said interface circuit so that said interface device permits logic and timing compatibility between said first and second devices, said computer having an input, a memory, and an output, said method comprising the steps of:

(a) inputting into said input of said computer the following waveform information: (1) identity of each of said input and output waveforms, (2) whether each said waveform is an input or an output, (3) a time for each asserted and non-asserted pulse in each of said waveforms,

(b) storing in said memory of said computer said waveform information;

(c) selecting, via said computer from said memory an output waveform;

(d) identifying, via said computer, in said memory those waveforms or their compliments which alone or logically combined with other waveforms stored in said memory constructs a waveform corresponding to said selected output waveform so that said constructed waveform permits said logical and timing capability,

(e) storing in said memory of said computer design information necessary for said construction of said selected output, said design information including: (1) identity of each of said waveforms necessary to construct said selected output for said compatibility, (2) a logical operation required such as compliment, AND, or OR for each aforesaid identified waveform, and (3) a time for each asserted and non-asserted pulse in said constructed waveform,

(f) repeating steps (c) through (e) for each remaining output waveform in said memory, and

(g) delivering to said output of said computer said design information signals when all output waveforms have been selected.

4,873,648
WATERCUT MONITOR DEVICE AND METHOD

Charles L. Mouser, and Joseph A. Stewart, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Apr. 30, 1987, Ser. No. 45,974

Int. Cl.[4] G01F *1/00*

U.S. Cl. 364—500 **20 Claims**

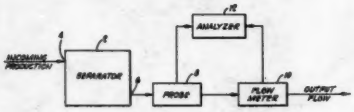
1. An apparatus for providing an analog output signal which is linearly proportional to the percentage of water in an emulsion, said apparatus comprising:

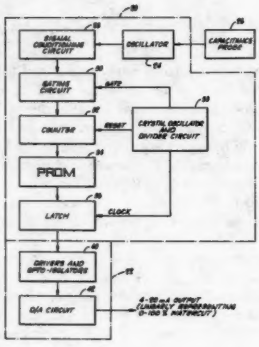
analog input means for generating an analog input signal

non-linearly proportional to the percentage of water in the emulsion;

digital means, responsive to said analog input means, for digitizing said analog input signal and for translating the digitized analog input signal into a digital signal linearly proportional to the percentage of water in the emulsion, said digital means including:

first conversion means, connected to said analog input means, for periodically converting said analog input signal into a respective digital count; and





second conversion means, connected to said first conversion means, for converting each said respective digital count into a respective digital value defining said digital signal; and

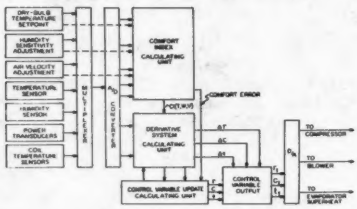
analog output means, responsive to said digital means, for converting said digital signal into an analog output signal so that said analog output signal is also linearly proportional to the percentage of water in the emulsion.

4,873,649

METHOD FOR OPERATING VARIABLE SPEED HEAT PUMPS AND AIR CONDITIONERS

Eric W. Grald, Maple Plain, and J. Ward MacArthur, Minneapolis, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jun. 10, 1988, Ser. No. 206,052
Int. Cl.[4] G05D *23/24;* F24F *3/14*
U.S. Cl. 364—505 **10 Claims**



6. A method for operating a system having variable speed equipment such as heat pumps and air conditioners while (1) achieving optimal comfort conditions in an air conditioned space and (2) maximizing the coefficient of performance (COP) of said equipment;

said equipment being characterized by having controls for varying parameters thereof;

said system having multiple sensory inputs from which variable comfort influencing data parameters are transmitted from said space to said equipment;

said method comprising the steps of:

providing a nonlinear measure of comfort function CI (data) based on said data parameters;

setting one of said data parameters and calculating default values for the other of said parameters;

calculating a set point value for said comfort function CI (data);

expressing said comfort function CI (data) in terms of said equipment parameters as a comfort function CI (manipulated control variables);

calculating a comfort error (CE) value which is said set point value of said CI (data) minus said CI (manipulated control variables);

selecting a nonlinear performance function PE (manipulated control variables) based on said equipment parameters which is desired to be maximized and which is based on the same variables as said CI (manipulated control variables); and

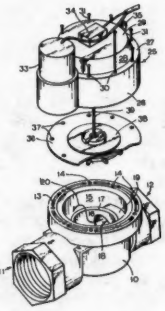
setting said controls to effect maximizing said PE (manipulated control variables) function while maintaining said (CE) value at substantially a zero value.

4,873,650

WATER FLOW CONTROLLER

Charles H. Reeves, Jr., 6263 Brightwell Pl., Acworth, Ga. 30101

Filed Apr. 16, 1987, Ser. No. 39,461
Int. Cl.[4] G01F *1/00;* F16K *31/48*
U.S. Cl. 364—510 **14 Claims**

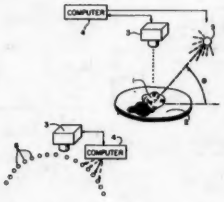


1. A water flow controller for limiting undesired and unexpected flow of water resulting from the rupture of a water pipe or the like, and wherein the controller comprises, in combination, sensor means for sensing commencement and termination of water flow, timer means coupled with said sensor means for timing uninterrupted periods of water flow sensed by said sensing means, valve means, and means for actuating said valve means in response to said timer means timing an uninterrupted period of water flow that exceeds a selected duration.

4,873,651
METHOD AND APPARATUS FOR RECONSTRUCTING THREE-DIMENSIONAL SURFACES FROM TWO-DIMENSIONAL IMAGES

Daniel Raviv, University Heights, Ohio, assignor to Case Western Reserve University, Cleveland, Ohio

Filed Apr. 21, 1987, Ser. No. 41,041
Int. Cl.[4] G06F *15/20*
U.S. Cl. 364—513 **26 Claims**



1. A method of reconstructing the third dimension of an object comprising:

disposing said object in a fixed position relative to a reference surface;

projecting substantially parallel rays of radiant energy at said object at a plurality of different angles relative to said reference surface;

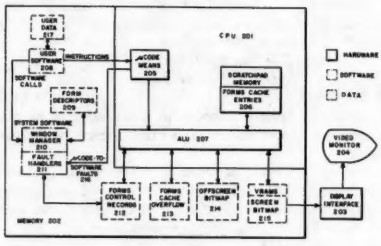
recording the relative locations and lengths of each of the shadows cast by the object at each of said angles, said shadows including portions thereof formed on the reference surface; and

determining from the length and relative location of each of said shadows cast and from the angle, relative to the reference surface, of the radiant energy at which said shadow is cast, the position of at least one point on a surface of said object relative to another point on said object.

4,873,652
METHOD OF GRAPHICAL MANIPULATION IN A POTENTIALLY WINDOWED DISPLAY

John Pilat, Hopkinton; David Keating, Holliston, and Wayne Colella, Newton, all of Mass., assignors to Data General Corporation, Westboro, Mass.

Continuation of Ser. No. 80,185, Jul. 27, 1987, abandoned, which is a continuation of Ser. No. 623,908, Jun. 25, 1984, abandoned. This application Nov. 27, 1988, Ser. No. 273,627
Int. Cl.[4] G06F *3/14*; G09G *1/02*
U.S. Cl. 364—518 **8 Claims**



1. A method for controlling the displays of a digital computer system, the system comprising:

main memory means for storing machine language instructions and data;

processing means for performing operations on data in response to the machine-language instructions, said processing means including a scratchpad memory;

display means for displaying representations of data; the method comprising the steps of:

(a) identifying a form descriptor to said processing means, said form descriptor for describing organization of data to be displayed;

(b) identifying a machine language instruction to said processing means, said machine language instruction specifying first data and specifying representations of first data which are to be displayed, and for describing the position within the organization described by the form descriptors at which the representations of the first data are to be displayed;

(c) determining whether or not said form descriptor is stored in internal form in either the scratchpad memory or said main memory means;

(d) transforming said form descriptor to internal form, if necessary;

(e) transferring the form descriptor in internal form into the scratchpad memory if it is not already there;

(f) calculating, in the processing means, second certain data determined by said machine-language instruction, said form descriptor in the scratchpad memory and certain first data specified by said machine-language instruction,

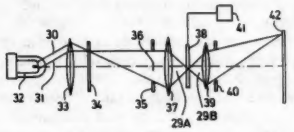
the second certain data being a representation of what is to be displayed; and

(g) forwarding the second certain data to the display means for representations of the second certain data to be displayed.

4,873,653
MICROSCOPE SYSTEM FOR PROVIDING THREE-DIMENSIONAL RESOLUTION

Rudolf E. Grosskopf, Koenigsbronn, Fed. Rep. of Germany, assignor to Carl-Zeiss-Stiftung, Heidenheim/Brenz, Fed. Rep. of Germany

Continuation of Ser. No. 850,487, Apr. 9, 1986, abandoned. This application Sep. 9, 1988, Ser. No. 243,150
Int. Cl.[4] G02B *26/00*; G06F *15/62*; G06G *9/00*
U.S. Cl. 364—525 **8 Claims**



1. A microscope system for providing an improved three-dimensional image of a specimen having properties including a variable index of refraction and a variable absorption and said three-dimensional image being defined by low and high frequency components, the system comprising:

a light source for generating light;

collimating means for collimating the light into a light beam and transmitting the beam along an optical axis;

a specimen holder for holding the specimen on said axis downstream of said collimating means;

an objective downstream of said specimen holder for generating and transmitting images of said specimen along said axis;

focus stepping means for changing the spacing between the specimen and said objective along the optical axis whereby a plurality of said images are obtained incorporating respective values of said index of refraction and said absorption, said images being indicative of respective positions within the specimen along said axis with each of said images including data corresponding to an in-focus portion and an out-of-focus portion;

light-modulating means for modifying the in-focus and out-of-focus portions of said image by attenuating the amplitudes of the low frequency components of the image and enhancing the high frequency components thereof; and,

computer means for sensing and receiving data corresponding to each of said images and for suppressing the out-of-focus portion corresponding thereto whereby an improved three-dimensional image data file of the specimen is obtained.

4,873,654

TESTING DEVICE AND METHOD FOR INFLATABLE OBJECTS

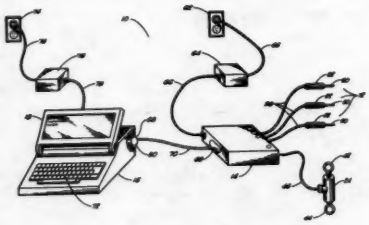
William B. Alexander, New Orleans, La., and Paul Frenger, Houston, Tex., assignors to Safe-Test, Inc., New Orleans, La.

Continuation-in-part of Ser. No. 619,601, Jun. 11, 1984, Pat. No. 4,642,783. This application Feb. 9, 1987, Ser. No. 12,576

The portion of the term of this patent subsequent to Feb. 10, 2004, has been disclaimed.

Int. Cl.[4] G06F *15/20*; G01N *7/00*

U.S. Cl. 364—551.01 **16 Claims**



1. A testing device for evaluating an inflatable object having expandible wall comprising:

transducer means for converting the physical inputs of temperature and pressure from said inflatable object into electrical impulses, said transducer means comprising:

a pressure transducer for evaluating the pressure of a gas within said inflatable object, said pressure transducer having a chamber connected thereto; and

a temperature transducer having a nozzle for connection to a valve of said inflatable object, said temperature transducer positioned adjacent said nozzle, said temperature transducer for measuring the temperature of said gas within said chamber of said pressure transducer;

connection means fastened to said transducer means for enabling said transducer means to be interactive with said physical inputs from said inflatable object, said connection means comprising a pressure transducer nozzle for connecting a valve of said inflatable object to said pressure transducer, said chamber of said pressure transducer being adjacent to and in air-tight connection with said pressure transducer nozzle, said chamber for allowing differential pressures within said chamber and said inflatable object to equalize upon connection of said pressure transducer nozzle to a valve of said inflatable object;

processing means electrically connected to said transducer means for selectively converting said electrical impulses of said transducer means into signals relative to said physical inputs of temperature and pressure, each of said pressure transducer and said temperature transducer having electrically conductive lines extending therefrom to said processing means, the signals from said transducer means being passed as separate inputs of temperature and pressure to said processing means, said processing means evaluating said inflatable object based on said signals; and

output means electrically connected to said processing means for producing a perceivable display of said signals from said processing means.

4,873,655

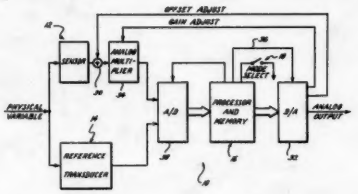
SENSOR CONDITIONING METHOD AND APPARATUS

George V. Kondraske, Arlington, Tex., assignor to Board of Regents, The University of Texas System, Austin, Tex.

Filed Aug. 21, 1987, Ser. No. 88,087

Int. Cl.[4] G01R *7/10*

U.S. Cl. 364—553 **21 Claims**



1. A method for conditioning the output characteristics of a sensor to conform to a desired transfer function, where the normal output of the sensor in measuring a physical quantity of interest deviates from the desired transfer function, comprising the steps of:

(a) measuring the physical quantity in a first condition with a reference transducer having the desired transfer function;

(b) measuring the physical quantity in the first condition with the sensor;

(c) repeating steps (a) and (b) with the physical quantity in a plurality of different conditions;

(d) building a changeable look-up table with the plurality of measurements of steps (a)-(c), where for each condition a sensor measurement corresponds to a reference transducer measurement conforming to the desired transfer function;

(e) measuring the physical quantity in an unknown condition using the sensor;

(f) conditioning the sensor measurement of step (e) to obtain an output conforming to the desired transfer function by adjusting the sensor output by providing real time feedback signals to obtain an adjusted sensor output and including the substeps

determining a corresponding reference transducer measurement using the adjusted sensor output from the look-up table, and

outputting the reference transducer measurement from the look-up table.

4,873,656

MULTIPLE PROCESSOR ACCELERATOR FOR LOGIC SIMULATION

Gary M. Catlin, Cupertino, Calif., assignor to Daisy Systems Corporation, Mountain View, Calif.

Filed Jun. 26, 1987, Ser. No. 67,633

Int. Cl.[4] G06F *13/36*

U.S. Cl. 364—578 **5 Claims**

1. A computer system coupled to a plurality of users for implementing an event driven algorithm of each of the users, comprising:

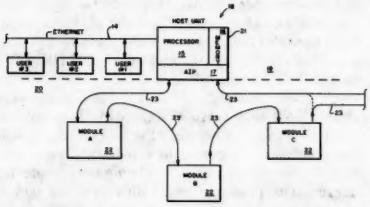
(1) a master processor coupled to the users for providing overall control of the computer system and executing the event driven algorithm of each of the users, the master processor further including a master memory;

(2) a unidirectional ring bus coupled to the master processor;

(3) a plurality of processor modules coupled to the unidirectional ring bus which transfers data among the processor modules and the master processor, each of the processor modules capable of receiving into a plurality of connectors a plurality of selectable simulation processors for independently operating on a portion of the event driven

algorithm and functioning substantially simultaneously to each other, each simulation processor including a simulation memory for storing the simulation data for circuit elements being simulated by that processor, the plurality of selectable processor including (i) a hardwired processor for providing rapid simulation of simpler circuit elements and (ii) a microcodable processor for providing simulation of more complicated circuit elements, each of the processor modules further including:

(a) an interprocessor bus coupled to the plurality of processors within the module for transferring the simulation data among the processors;



(b) an interface means coupled to the unidirectional bus and interprocessor bus for transferring the simulation data between the unidirectional bus and the interprocessor bus, the interface means including (i) a first storage means for storing data from the ring bus that is destined for a processor of the plurality of processors of the module; (ii) a second storage means for storing data from the simulation processor that is destined for transfer external to the module; and (iii) a bypass means for bypassing data on the ring bus that is not destined for the module;

wherein intra-module transfer of data on the interprocessor bus occurs independently of transfer of data on the unidirectional bus.

4,873,657

METHOD FOR SIMULATING AN IMAGE BY CORRELLATION

Gertrude H. Kornfeld, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 13, 1987, Ser. No. 120,458
Int. Cl.[4] G06F *15/66*
U.S. Cl. 364—578 **4 Claims**

1. In the method of simulating an image projected by an optical scanning system which, due to the presence of specific lenses, mirrors and other such optical elements has an analog shift spread function, wherein said image is simulated by an idealized image in the form of an x-y array matrix of pixels, line scanned along the x axis, each spaced a distance Δ from adjacent pixels and having an input power $P_i(I_x, I_y)$ where Ix and Iy are positions in said matrix expressed as integral values of Δ; a submethod for also simulating said spread function comprising the following steps:

A. digitize the image such that each picture element (PIXEL) represents a detector sample of the system to be simulated, thus providing a number of first sets of input pixel values, each said set representing a scan line in the system of image;

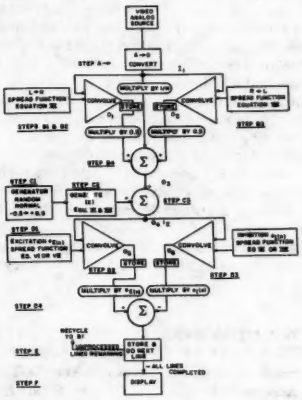
B. starting with the first image line as the current line simulate the spread function of the optical elements by the substeps;

B1. convolve said input values for said current line with a right-to-left assymetrical spread function $P_{om}(n)$, where $P_{om}(n)=(1-e_n)P_i(n)+e_nP_{om}(n-1)$, to obtain a first set of output values;

B2. store said first step of output values;

B3. repeat steps B1 and B2 with a left-to-right spread function $P_{op}(n)$, where $P_{op}(n)=(1-e_n)P_i(n)+e_nP_{op}(n-1)$, to obtain and store a second set of output values;

B4. add half of each corresponding value in said first set of output values to each corresponding value in said second set of output values and subtract a given fraction of the corresponding input value, to obtain a third set of output values;



E. store the last completed set of output values, if any line remains unprocessed as above, then repeat steps B1 through E with each of the remaining lines in the image in place of said first image line as said current line; and

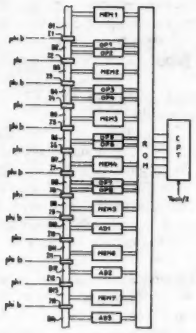
F. display the resulting image as a shade of gray IV type image.

4,873,658

INTEGRATED DIGITAL SIGNAL PROCESSING CIRCUIT FOR PERFORMING COSINE TRANSFORMATION

Joël Cambonie, Fontaine, France, assignor to SGS-Thomson Microelectronics S.A., Paris, France

Filed Dec. 21, 1987, Ser. No. 135,266
Claims priority, application France, Dec. 22, 1986, 86 17936
Int. Cl.[4] G06F *15/332*
U.S. Cl. 364—725 **2 Claims**



1. An integrated circuit for the digital processing of signals, performing a specific transformation of input signals representing a digital values x_j so as to produce signals representing n coefficients F_ν of the form

$$F_v = \sum_{j=0}^{n-1} x_j f(j,v)$$

wherein f(j,v) is a function of the indexes j and v, comprising:

a signal transmission bus for unidirectionally transmitting a signal of p bits representing a digital value;

switches spaced apart along the bus for letting the signals pass along the bus or for interrupting these signals, with any two adjacent switches along the bus being actuated in phase opposition, so as to divide the bus into sections, each bus section communicating alternately with a preceding section and a following section;

computing operators are connected to certain sections of the bus and may receive successive data of p bits therefrom, for carrying out a computation on this data and sending resulting data over this bus section;

buffer memories are connected to other bus sections so as to receive several successive data therefrom and send them over a bus in an order different from the order in which they were received;

microprogrammed sequences for controlling each of said computation operator or said buffer memory.

4,873,659

C-MOS ARITHMETIC - LOGIC UNIT WITH HIGH CARRY PROPOGATION SPEED

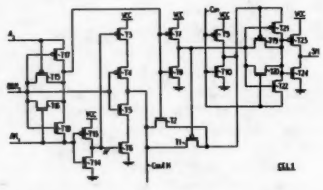
Luigi Licciardi, Almese, and Alessandro Torielli, Torino, both of Italy, assignors to Cselt - Centro Studi E Laboratori Telecomunicazioni Spa, Torino, Italy

Filed Apr. 27, 1988, Ser. No. 186,897

Claims priority, application Italy, May 27, 1987, 67459 A/87

Int. Cl.[4] G06F 7/50

U.S. Cl. 364—784 **6 Claims**



1. A C-MOS arithmetic-logic unit for calculating addition and subtraction minima between two operands A and B, and comparison between a datum and a threshold, wherein addition and subtraction operations are carried out by a carry-propogating adder consisting of elementary cells, one cell for each bit of the two operands, said cells being cascade-connected for carry propogation, each elementary cell basically comprising:

a first EX-OR logic gate (T15, T16, T17, T18) receiving said bits of said operands (A, B);

a first inverter (T9, T10) which receives an input carry;

a second inverter (T7, T8) which receives the output of said first EX-OR logic gate;

a first transfer gate (T1, T2) which receives at the transfer input of said first inverter, and which is controlled by input and output logic levels of said second inverter;

a second EX-OR logic gate (T19, T20, T21, T22) which receives the input carry and the output of said second inverter, and supplies the addition result (SN);

a first pair of series-connected P-MOS transistors (T3, T4) and a second pair of series-connected N-MOS transistors (T5, T6), said first and second pair being connected in series between two reference voltages, a bit of the first operand (A) being applied to gates of respective transistors of both pairs, the bit of the second operand (B) being brought to the gate of the other transistor of both pairs, the common node of said two pairs being connected to the output of said first transfer gate (T1, T2) and supplying an output carry, wherein for minima and comparison operations said elementary cells perform subtraction and individually further comprise:

third and fourth transfer gates (TG1, TG2) which receive at the transfer input the first and second operand respectively, and have a common transfer output (ANBN), and which are controlled by a first and second control signal (SEL, SELN) which in case of a minimum operation transfer to the output the inferior operand on the basis of the carry level outgoing from the last cell, and in case of comparison said first operand;

third (T34) and fourth (T35) P-MOS transistors and fifth (T36) and sixth (T37) N-MOS transistors, all connected in series between the two reference voltages, said third and fifth transistors receiving at the gate said result (SN) from the relevant elementary cell, said fourth and sixth transistors receiving at the gate a third (BEST) and a fourth (INFN) control signal; and

seventh (T38) and eighth (T39) P-MOS transistors and ninth (T40) and tenth (T41) N-MOS transistors, all connected in series between the two reference voltages, the points common to said third and fourth and said seventh and eighth transistors being interconnected, the intermediate points in said series between said eighth and ninth and between said fourth and fifth transistors being interconnected to supply an output (U) of the unit, said eighth and tenth transistors receiving at the gate said common transfer output (ANBN), said seventh and ninth transistors receiving at the gate said fourth (INFN) and third (BEST) control signals respectively, said control signals taking up such logic levels that said output (U) in case of addition or subtraction, if there is no saturation, is said result (SN), otherwise said output is in a state indicative of saturation; in case of minimum said output (U) is said common transfer output; in case of comparison, if there is no saturation, said output (U) is said transfer output, otherwise said output (U) is in said state indicative of saturation.

4,873,660

ARITHMETIC PROCESSOR USING REDUNDANT SIGNED DIGIT ARITHMETIC

Tamotsu Nishiyama, and Shigeo Kuninobu, both of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jun. 25, 1987, Ser. No. 66,817

Claims priority, application Japan, Jun. 27, 1986, 61-152451; Jun. 27, 1986, 61-152452; Jun. 27, 1986, 61-152455

Int. Cl.[4] G06F 7/49

U.S. Cl. 364—768 **20 Claims**

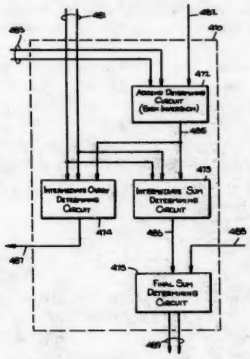
1. An arithmetic processor which performs addition or subtraction of two redundant signed-digit numbers X and Y of radix r having N digits denoted by single digits x_i and y_i, where i is an index which assumes integer values ranging from 1 to N to denote digits in descending order, said arithmetic processor for each order comprising:

(a) means for receiving a control signal and a single digit, and in response to the value of said control signal, producing an output operand by either inverting the sign of said single digit, leaving said single digit unchanged, or replacing said single digit operand with 0;

(b) a first arithmetic means for receiving said output operand and for receiving a second single digit, and determining therefrom, in the case of addition an intermediate sum and an intermediate carry, or, in the case of subtraction, determining therefrom an intermediate difference and an intermediate borrow, said intermediate carry or borrow being output by said first arithmetic means for utilization in the processing of the next higher order digits; and

(c) a second arithmetic means for determining the final sum by combining an intermediate carry obtained from processing the digits of the next lower order and said interme-

diate sum, or in the case of subtraction, determining the final difference by combining an intermediate borrow obtained from processing the digits of the next lower order and said intermediate difference;



whereby said arithmetic processor performs addition or subtraction of said two redundant signed-digit numbers X and Y in a manner which eliminates carry-propagation.

4,873,661

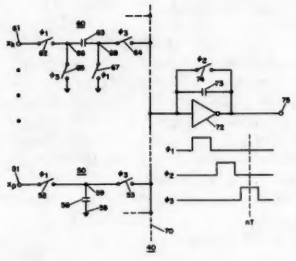
SWITCHED NEURAL NETWORKS

Yannis Tsividis, 601 W. 113th St., New York, N.Y. 10025

Filed Aug. 27, 1987, Ser. No. 90,126

Int. Cl.[4] G06F *15/46*; H03K *19/08*

U.S. Cl. 364—807 **7 Claims**



1. A neural network including a plurality of neurons, each comprising non-linear amplifying means including input means and an output terminal, the output terminal of each being connected to the input means of other amplifying means of the plurality for supplying its output as an input to said other amplifying means, each of said neurons being characterized by the inclusion of capacitor means and switching means in said input means for storing an input signal for sampling and for weighting.

4,873,662

INFORMATION HANDLING SYSTEM AND TERMINAL APPARATUS THEREFOR

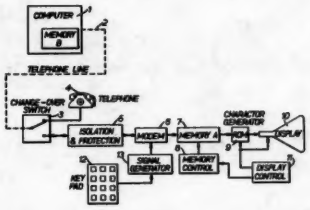
Desmond J. Sargent, Felixstowe, England, assignor to The Post Office, United Kingdom

Continuation of Ser. No. 814,922, Jul. 12, 1977, abandoned. This application Aug. 15, 1980, Ser. No. 178,307

Claims priority, application United Kingdom, Jul. 20, 1976, 30137/76

Int. Cl.[4] G06F *13/00*

U.S. Cl. 364—900 **7 Claims**



1. A digital information storage, retrieval and display system comprising:

a central computer means in which plural blocks of information are stored at respectively corresponding locations, each of which locations is designated by a predetermined address therein by means of which a block can be selected, each of said blocks comprising a first portion containing information for display and a second portion containing information not for display but including the complete address for each of plural other blocks of information;

plural remote terminal means, each including (a) modem means for effecting input/output digital data communication with said central computer means via the telephone lines of a telephone network, (b) local memory for locally storing digital data representing at least the first portion of the selected block of information received via said modem means from the central computer, (c) display means for visually displaying such a locally stored first portion of a block of information and (d) key pad means connected to communicate data to at least said modem means for manual entry of keyed digital data; and

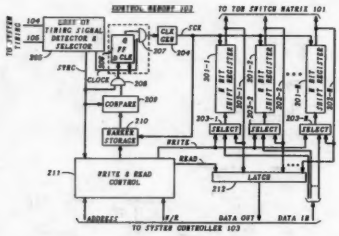
further memory means being provided as a part of said central computer means for receiving and storing said second portion of the block of information selected by a particular terminal means in response to the selection of the block and when its respective first portion is transmitted to that terminal means for display, said central computer means utilizing keyed digital data from that particular terminal means of less extent than any one of said complete addresses for another block of information but nevertheless uniquely indicative of one of the complete addresses contained in said portion of the block of information which contains the first portion then being displayed by that particular terminal means for selectively accessing the part of said further memory means associated with that particular terminal means and for supplying the complete address of the next block of information which is to be retrieved for that particular terminal means and utilized for display purposes at that terminal means.

4,873,663

CONTROL MEMORY USING RECIRCULATING SHIFT REGISTERS FOR A TDM SWITCHING APPARATUS

Lawrence Baranyai, Howell, and Dominick Scordo, Middletown, both of N.J., assignors to American Telephone and Telegraph Company, New York, N.Y. and AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 25, 1988, Ser. No. 185,653
Int. Cl.[4] G11C *21/00, 19/00*
U.S. Cl. 365—73 8 Claims



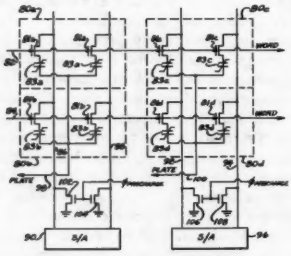
1. Control memory apparatus comprising,
a plurality of shift registers each connected in a recirculating configuration and arranged to form a matrix of storage cells,
a source of a system timing signal and a system synchronization signal,
means for storing a timing marker,
means responsive to said system timing signal for advancing bits in said plurality of shift registers and said timing marker in said means for storing,
means for detecting when said timing marker is out of synchronism with said system synchronization signal, and
means for inhibiting advancing of said bits in said plurality of shift registers and said timing marker in said means for storing for a predetermined interval when said timing marker is out of synchronism with said synchronization signal.

4,873,664

SELF RESTORING FERROELECTRIC MEMORY

S. Sheffield Eaton, Jr., Colorado Springs, Colo., assignor to Ramtron Corporation, Colorado Springs, Colo.

Filed Feb. 12, 1987, Ser. No. 13,746
Int. Cl.[4] G11C *7/00, 11/22*
U.S. Cl. 365—145 29 Claims



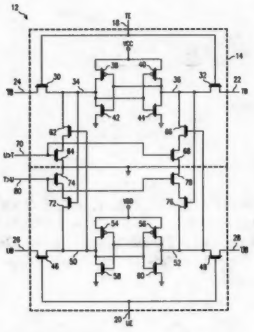
1. In a nonvolatile ferroelectric memory of the type having a plurality of memory cells arranged in rows and columns, each column comprising a bit line coupled to memory cells along the column, each said memory cell comprising a ferroelectric capacitor having first and second plate electrodes, the polarization of said capacitors corresponding to the data stored therewithin, the improvement wherein:
said memory further comprises a plurality of word lines and a plurality of plate lines distinct from said bit lines and word lines, each of the memory cells along a row being coupled to a word line corresponding to the row, each memory cell being coupled also to a corresponding plate line, each plate line being coupled to plate electrodes in a plurality of said cells,
each said memory cell further including a respective switching device located within the memory cell, said first plate electrode of said capacitor in said cell being coupled to its corresponding bit line via said switching device, said switching device being coupled to be controlled by said corresponding word line, said second plate electrode of said capacitor in said cell being coupled to said corresponding plate line.

4,873,665

DUAL STORAGE CELL MEMORY INCLUDING DATA TRANSFER CIRCUITS

Ching-Lin Jiang, Dallas, and Clark R. Williams, Plano, both of Tex., assignors to Dallas Semiconductor Corporation, Dallas, Tex.

Filed Jun. 7, 1988, Ser. No. 203,424
Int. Cl.[4] G11C *11/40, 19/00*
U.S. Cl. 365—154 12 Claims



4. Apparatus for storing data comprising:
first and second memory cells, each memory cell having first and second complementary data nodes;
first transfer means, coupled to said first and second data nodes of said first memory cell for transferring data into and out of said first memory cell independent of data stored in said second memory cell;
second transfer means, coupled to said first and second data nodes of said second memory cell, for transfer data into and out of said second memory cell independent of data stored in said first memory cell; and
third transfer means, separate from said first and second transfer means, and coupled to said first and second data nodes of said first and second memory cells, for transferring data between said first and second memory cells;
wherein said third transfer means comprises first and second switching means for coupling said first data node of said first memory cell to ground potential when an input terminal coupled to said first switching means and said first data node of said second memory cell, which is coupled to a control input of said second switching means, are both at a first logic state.

4,873,666
MESSAGE FIFO BUFFER CONTROLLER

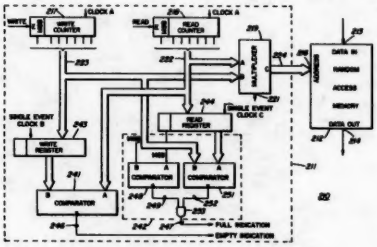
Martin C. Lefebvre, Ottawa; Carmine A. Ciancibello, and Youssef A. Geadah, both of Nepean, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Oct. 15, 1987, Ser. No. 108,655

The portion of the term of this patent subsequent to Oct. 10, 2006, has been disclaimed.

Int. Cl.[4] G11C *7/00, 8/00*

U.S. Cl. 365—189.07 **8 Claims**



1. A control circuit for a FIFO (first in first out) memory circuit for providing address information to a FIFO memory means having an address field of n bits, said control circuit comprising:

a first means for providing a first binary signal having n+1 bits;

a second means for providing a second binary signal having n+1 bits;

a first storage means for selectively receiving and storing the output of said first means;

second storage means for selectively receiving and storing the output of said second means;

first comparator means for comparing the output of said first storage means with the output of said second means and producing a first control signal indicative of said comparison; and

second comparator means for comparing the output of said second storage means with the output of said first means and producing a second control signal indicative of said comparison.

4,873,667
FIFO BUFFER CONTROLLER

Youssef A. Geadah, Nepean, and Martin C. Lefebvre, Ottawa, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Oct. 15, 1987, Ser. No. 108,653

The portion of the term of this patent subsequent to Oct. 10, 2006, has been disclaimed.

Int. Cl.[4] G11C *7/00, 8/00*

U.S. Cl. 365—189.07 **6 Claims**

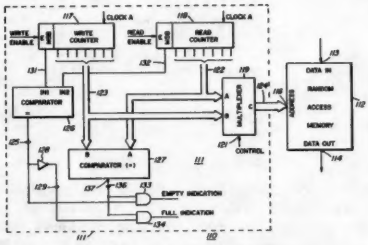
1. A control circuit for a FIFO (first in first out) memory circuit for providing address information to FIFO memory means having an address field of n bits, said control circuit comprising:

a first means for providing a first binary signal having n+1 bits;

a second means for providing a second binary signal having n+1 bits;

first comparator means for comparing the most significant bit of said first signal with the most significant bit of said second signal and producing a first control signal indicative of said comparison;

second comparator means for comparing the n least significant bits of said first signal with the n least significant bits of said second signal, and producing a second control signal indicative of said comparison;



logic means, responsive to said first control signal and said second control signal, for producing an indicator signal of said memory circuit being full or not full.

4,873,668
INTEGRATED CIRCUIT IN COMPLEMENTARY CIRCUIT TECHNOLOGY COMPRISING A SUBSTRATE BIAS GENERATOR

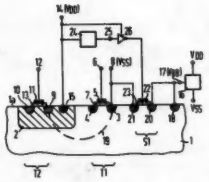
Josef Winnerl, Landshut, and Dezsö Takacs, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Aug. 17, 1987, Ser. No. 86,295

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1986, 3633301

Int. Cl.[4] G11C *7/00, 11/40*

U.S. Cl. 365—189.09 **7 Claims**



1. In an integrated circuit executed in complementary circuit technology comprising a pair of field effect transistors (T1, T2) of different channel types, said first field effect transistor (T1) being provided in a doped semiconductor substrate (1) of a first conductivity type and at least one second field effect transistor (T2) being arranged in a well-shaped semiconductor zone (2) of a second conductivity type provided in said semiconductor substrate (1), said semiconductor zone adapted to be wired to a supply voltage (V_{DD}), whereby a terminal region (3) of at least one first field effect transistor (T1) is charged with a grounded potential (VSS), the semiconductor substrate adapted to be connected to the output (17) of a substrate bias generator (16) to which the grounded potential and the supply voltage are supplied and which biases the p-n junction between the terminal region (3) of the first field effect transistor lying at ground potential and the semiconductor substrate (1) in non-conducting direction, the combination comprising;

an electronic switch for connecting the output (17) of the substrate bias generator (16) to ground potential for a predetermined time after said supply voltage (V_{DD}) is applied; and

a time delay circuit connected between said electronic switch and said supply voltage (V_{DD}) for opening said

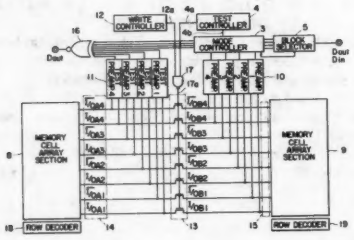
switch in response to said supply voltage after said predetermined time.

4,873,669

RANDOM ACCESS MEMORY DEVICE OPERABLE IN A NORMAL MODE AND IN A TEST MODE

Kiyohiro Furutani; Koichiro Mashiko; Kazutami Arimoto; Noriaki Matsumoto, and Yoshio Matsuda, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 24, 1987, Ser. No. 77,306
Claims priority, application Japan, Jul. 30, 1986, 61-179741
Int. Cl.[4] G11C 7/00, 11/40
U.S. Cl. 365—189.01 9 Claims



1. A semiconductor memory device operable for reading and writing in a normal mode and in a test mode comprising, two memory cell sections each having an identical number of blocks in the memory cell sections,

data bus lines connected to respective ones of the blocks,

switch means for interconnecting data bus lines connected to blocks of different ones of the memory cell sections comprising switches associated with each of the data bus lines connected to the plurality of memory cell sections, the switches being configured so as to connect each other to the data bus lines connected to each of the memory cell sections,

switch control means for causing the switch means to be conductive during reading and writing in the normal mode and during writing in the test mode, and causing the switch means to be nonconductive during reading in the test mode,

first output means connected to the data bus lines that are connected to the blocks of one of the memory cell sections for applying input data onto the data bus lines for writing in the blocks of the section simultaneously during writing in the normal mode and in the test mode, and for outputting the data read out of the blocks of the sections during reading in the normal mode, and for outputting the data read out of the blocks of said one of the sections during reading in the test mode, and

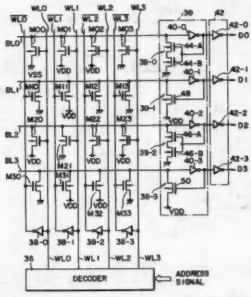
second output means connected to the data bus lines that are connected to the blocks of at least one of the memory cell sections other than said one of the memory cell sections, for outputting the data read out of the memory cell blocks of the at least one of the memory cell sections during the reading in the test mode.

4,873,670

COMPLEMENTARY SEMICONDUCTOR MEMORY DEVICE WITH PULL-UP AND PULL DOWN

Yasunori Tanaka, Yokohama, and Hideo Hashimoto, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki and Tosbac Computer System Co., Ltd., Tokyo, both of, Japan

Filed Jun. 13, 1986, Ser. No. 873,963
Claims priority, application Japan, Jun. 18, 1985, 60-130867
Int. Cl.[4] G11C 7/00, 11/40
U.S. Cl. 365—189.11 4 Claims



1. A master slice type semiconductor memory device, comprising:

a plurality of basic cells, each constituted by p- and n-channel MOS transistors, formed as a gate array on a CMOS master slice chip;

first and second power terminals;

a plurality of word lines;

a plurality of bit lines; and

a memory section including a plurality of said p- and n-channel MOS transistors, each of said MOS transistors having a gate connected to a corresponding one of said word lines, a drain connected to a corresponding one of said bit lines, and a source selectively connected to one of said first and second power terminals to form a memory cell which is driven via the corresponding word line and supplies a potential of said one power terminal to the corresponding bit line as preset data,

in which said plurality of bit lines includes a first bit line dedicated to connection with the n-channel MOS transistors and a second bit line dedicated to connection with the p-channel MOS transistors, the memory device further comprising a pull-up compensation circuit for pulling up an output potential of said first bit line and a pull-down compensation circuit for pulling down an output potential of said second bit line.

4,873,671

SEQUENTIAL READ ACCESS OF SERIAL MEMORIES WITH A USER DEFINED STARTING ADDRESS

Vikram Kowshik, San Jose; Sudhakar Boddu, Sunnyvale, and Elroy M. Lucero, San Jose, all of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

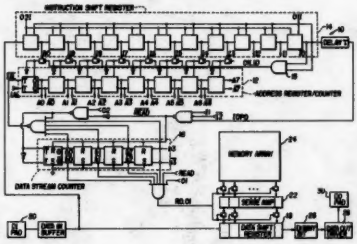
Filed Jan. 28, 1988, Ser. No. 149,399
Int. Cl.[4] G11C 7/00, 8/00
U.S. Cl. 365—189.12 4 Claims

1. Apparatus for reading a sequential series of storage registers within a memory array wherein the memory array includes a plurality of storage registers organized for read access by having sequential binary addresses associated therewith, each storage register having capacity for storing data comprising a plurality of data bits, the apparatus comprising:

(a) address register/counter means for storing a binary address which is used to access a preselected storage register

within the memory array to serially read the data bits from the preselected storage register, the address register/-counter means including means for incrementing the stored binary address by 1 upon receipt of an increment signal; and

(b) means for determining that all of the plurality of data bits stored in the preselected storage register have been read



from the preselected storage register and for generating the increment signal in response to said determination such that data is read from storage registers within the memory array having sequential binary addresses, whereby the apparatus automatically initiates a read of a sequence of storage registers in the array, the read sequence comprising a variable number of storage registers.

4,873,672

DYNAMIC RANDOM ACCESS MEMORY CAPABLE OF FAST ERASING OF STORAGE DATA

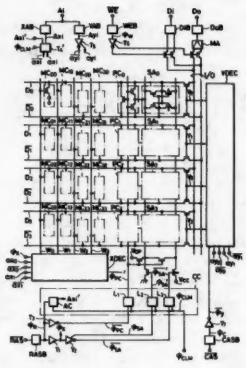
Jun Etoh, Hachioji; Katsuhiro Shimohigashi, Musashimurayama; Kazuyuki Miyazawa, Iruma; Katsutaka Kimura, Akishima, and Takesada Akiba, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Device Engineering Co., Ltd., Mobara, both of, Japan

Filed May 20, 1987, Ser. No. 51,715

Claims priority, application Japan, May 21, 1986, 61-114640

Int. Cl.[4] G11C *7/00*

U.S. Cl. 365—218 **15 Claims**



1. A semiconductor dynamic random access memory comprising:

a plurality of word lines;

a plurality of data lines arranged in such a manner as to cross said word lines;

memory cells electrically connected to said word lines and to said data lines;

sense amplification circuits coupled to said data lines, respectively;

selection means for selecting one of said word lines;

means for selecting one of said data lines;

means for writing predetermined data into said memory cells by use of said data lines;

means for providing a control signal for controlling an operation of erasing storage data stored in the memory cells;

means for precharging said data lines;

means for sequentially selecting and driving said word lines responding to the control signal while the storage data is erased; and

control circuit means for holding said sense amplification circuits under an on-state responding to the control signal while said word lines are sequentially selected and driven, while the storage data is erased,

wherein said control circuit means comprises:

a data line precharge signal control circuit for controlling said precharge means to be in an off-state while the storage data is erased, responding to the control signal; and

a sense amplifier control circuit for controlling the sense amplification circuits to be in their on-states while the storage data is erased, responding to the control signal.

4,873,673

DRIVER CIRCUIT HAVING A CURRENT MIRROR CIRCUIT

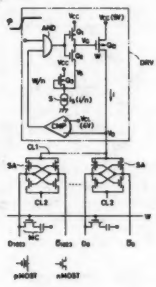
Ryoichi Hori, Tokyo; Kiyoo Itoh, Higashikurume; Goro Kitsukawa, Tokyo; Yoshiki Kawajiri, Hachioji; Takao Watanabe, and Takayuki Kawahara, both of Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 30, 1987, Ser. No. 126,485

Claims priority, application Japan, Dec. 3, 1986, 61-286610; Feb. 20, 1987, 62-35519; Jul. 8, 1987, 62-168652

Int. Cl.[4] G11C *8/00, 7/00;* H03K *3/01*

U.S. Cl. 365—230.06 **11 Claims**



1. A driver circuit characterized by including at least one current mirror circuit which is controlled by a pulse input signal and an output current of which drives a load, wherein said current mirror circuit includes a first MOS transistor and a second MOS transistor, the sources of said first MOS transistor and said second MOS transistor being supplied with an operating potential, the drain of said first MOS transistor being connected electrically to said load to be driven by said output current, the gate and the drain of said second MOS transistor being electrically connected to a current source, and the gate of said first MOS transistor and the gate of said second MOS transistor being connected electrically to one another through first means which is controlled by said pulse signal.

4,873,674
CORROSION RESISTANT BRONZE ALLOYS AND GLASS MAKING MOLD MADE THEREFROM

Thomas W. McCausland, Brockway, Pa., assignor to O-I Brockway Glass, Inc., Toledo, Ohio

Filed Feb. 24, 1989, Ser. No. 315,104
Int. Cl.[4] C22C 9/06; C03B 11/00
U.S. Cl. 65—374.12 **11 Claims**

1. An aluminum bronze alloy for glassmaking molds, the alloy having the following ingredients in approximate percent by weight:

	BG-650
Aluminum (%)	8.0–12.0
Nickel (%)	12.0–18.0
Iron (%)	1.0–6.0
Manganese (%)	0.5–6.0
Silicon (%)	0.1–2.0
Copper	balance

and the alloy having the following properties:

Tensile Strength (psi)	75,000–100,000
Yield Strength (psi)	35,000–60,000
Elongation (%)	1.0–6.0
Hardness (BHN)	175–250
Thermal Conductivity	36–40

at 850° F. (BTU/hr/ft^2/ft/°F.), the alloy being corrosion resistant and resistant to pitting from contact with hot glass.

10. A method of making a glass making mold member, the method comprising: forming the mold member from a bronze alloy composition consisting essentially of the following ingredients in approximate percent by weight:

Ingredients	Percent by weight
Aluminum	8–12
Nickel	12–18
Iron	1–6
Manganese	0.5–6
Silicon	0.1–2.0
Copper	balance

4,873,675
METHOD AND APPARATUS FOR SEISMIC EXPLORATION OF STRATA SURROUNDING A BOREHOLE

Frederick J. Barr, Jr., Houston; Thomas R. Beasley, Katy, and Richard H. Piggin, Fort Worth, all of Tex., assignors to Halliburton Logging Services, Inc., Houston, Tex.

Filed Jun. 10, 1988, Ser. No. 205,291
Int. Cl.[4] G01V 1/40, 1/20
U.S. Cl. 367—57 **13 Claims**

1. An apparatus for seismic exploration of the strata adjacent to a well borehole during drilling of that borehole, the apparatus comprising:

(a) a drill bit disposed within a borehole at the lower end of a drill string;

(b) a first geophone disposed supported by said drill string proximate to said drill bit;

(c) a jar means incorporated along said drill string above said drill bit for selectively applying an impact to said drill bit;

(d) a shock absorbing joint so incorporated along said drill spring above said jar mechanism wherein operation of said jar means creates an impact and said shock absorbing means prevents impact propagation up said drill string;

(e) geophones operatively disposed on the surface of the earth in the vicinity of said borehole;

(f) a seismic recording device coupled to said geophones disposed on the surface of the earth and said first geophone for recording the impact and seismic waves resultant therefrom;

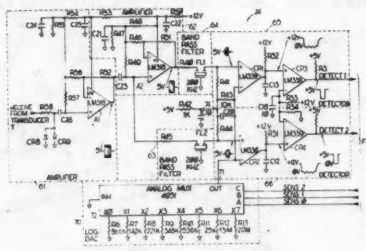
(g) mating separable electrical connectors operable in drilling fluid, one of said connectors being connected to said first geophone located in said drill string for connection with the other of said connectors; and

(h) a cable supporting the other of said electrical connectors sufficiently long to enable electrical connection through said drill string to provide a signal from said first geophone to said seismic recording device.

4,873,676
SONAR DEPTH SOUNDER APPARATUS

James B. Bailey, Abbeville; Robert R. Gibson, Eufaula; Alvin Nunley, III, Eufaula, and Q. Wayne Utz, Eufaula, all of Ala., assignors to Techsonic Industries, Inc., Lake Eufaula, Ala.

Division of Ser. No. 745,133, Jun. 14, 1985. This application Jul. 28, 1987, Ser. No. 78,871
Int. Cl.[4] G01S 15/08, 15/96
U.S. Cl. 367—98 **25 Claims**



1. An improved variable sensitivity sonar receiver for use in an echo ranging depth sounder, comprising:

fixed gain amplifier means responsive to amplify an input signal at a predetermined gain to provide an amplified output signal, said amplifier means comprising a pair of cascaded amplifier stages, each of said amplifier stages operative to amplify an input signal at a predetermined gain,

one of said amplifier stages being operative to amplify the output signal provided by the other one of said amplifier stages to provide a high gain output signal and other one of said amplifier stages being operative to amplify said input signal to provide a low gain output signal;

comparator means for providing a comparator output signal when said amplified output signal exceeds a threshold signal, said comparator means comprising a first comparator and a second comparator,

said first comparator being operative to receive said high gain output signal and said second comparator being operative to receive said low gain output signal, each of said comparators providing said comparator output signal when the magnitude of its respective amplifier output signal exceeds the magnitude of said threshold signal;

means responsive to said comparator output signal for providing a target detection signal; and

means responsive to said target detection signal for varying said threshold signal as a function of a number of said target detection signals received.

4,873,677

CHARGING APPARATUS FOR AN ELECTRONIC DEVICE

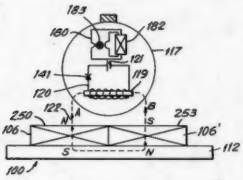
Kenji Sakamoto; Nobuo Ishikawa, and Motomu Hayakawa, all of Suwa, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan

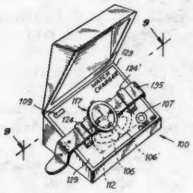
Filed Jul. 7, 1988, Ser. No. 216,914

Claims priority, application Japan, Jul. 10, 1987, 62-106457[U]; Jul. 15, 1987, 62-176399; Jul. 15, 1987, 62-176400; Jul. 15, 1987, 62-176401

Int. Cl.[4] G04C *10/04*; H01M *10/44*

U.S. Cl. 368—204 **36 Claims**





36. A method for charging a power storage device provided within an electronic device which also includes at least one secondary coil, said method comprising:

placing the electronic device at a predetermined position on a surface of a casing of a charging apparatus with the at least one secondary coil near said surface;

positioning a pair of primary coils and a coil yoke at a predetermined position within the casing;

generating an oscillating signal; and

switching the direction of direct current flow through the primary coils in response to the oscillating signal so as to induce an alternating current in the at least one secondary coil for charging the power storage device whereby during charging of the power storage device substantially all of the magnetic flux of the magnetic field produced by the pair of primary coils flows through at least one secondary coil and the coil yoke.

4,873,678

OPTICAL HEAD AND OPTICAL INFORMATION PROCESSOR USING THE SAME

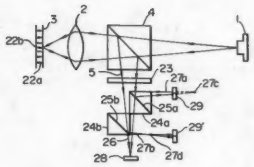
Shigeru Nakamura, Tachikawa; Sadatsugi Machida, Hachioji, and Tsuyoshi Toda, Kodaira, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 9, 1987, Ser. No. 130,637

Claims priority, application Japan, Dec. 10, 1986, 61-292307; Mar. 18, 1987, 62-61022

Int. Cl.[4] G11B *11/12, 7/09, 7/12*

U.S. Cl. 369—13 **20 Claims**



1. An optical head comprising:

a light source;

focusing means for focusing a light beam which is emitted from said light source, on an information medium;

beam separating means for isolating at least part of a light beam which is reflected from said information medium, from the light beam emitted from said light source;

beam splitting means including a first polarized-light separating film, said first polarized-light separating film being illuminated with about a half of a light beam isolated by said beam separating means; and

light detecting means including first and second photodetectors, said first photodetector being used to receive a first light beam reflected from said first polarized-light separating film, said second photodetector being used to receive a second light beam passing through said first polarized-light separating film, at least one of said first and second photodetectors being separated into a pair of light detecting elements.

4,873,679

OPTICAL INFORMATION RECORDING DISK AND OPTICAL INFORMATION RECORDING DISK APPARATUS

Katsumi Murai, Kyoto, and Makoto Usui, Suita, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 21, 1987, Ser. No. 135,453

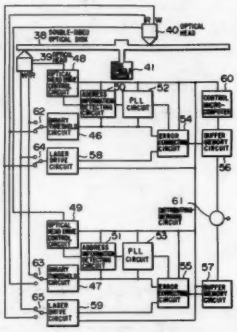
Claims priority, application Japan, Dec. 25, 1986, 61-311358; Dec. 25, 1986, 61-311359; Dec. 25, 1986, 61-311360

Int. Cl.[4] G11B *7/007*

U.S. Cl. 369—32 **6 Claims**

5. An optical information recording disk apparatus comprising: an optical information recording disk having address information section on tracks for identifying the location where information is recorded, first information recording sections provided at a constant angular interval on said tracks, and partitioned information sections provided by dividing part or all of said first information recording sections, said partitioned information sections having each a length longer than a predetermined length and having a maximum allowable number of divisions per said first information recording section determined depending on the radius of track; at least one pair of heads for writing or reading information on said optical information recording disk; means for converting information read out of said optical information recording disk into binary information; a buffer memory for storing binary information written or read by said heads; means for rotating said optical information recording disk at a constant angular velocity; means for identifying said address information; and means for

recording a constant quantity of information per said partitioned information section, wherein said pair of heads access to different tracks, with a sum of numbers of divisions of said first information recording sections being a constant value, and, at recording, binary information to be recorded in quantity equivalent to said sum of divisions is written into said buffer memory during each certain angular revolution of said disk and, thereafter the binary information is read out of said buffer memory



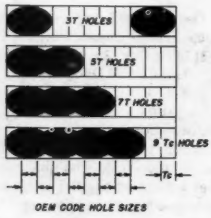
and supplied to said partitioned information sections distributively for said head pair depending on said division number, and, at reproduction, information picked up by said pair of heads is converted into binary information and written in said buffer memory and binary information in quantity equivalent to said sum of division numbers is read out of said buffer memory during said angular revolution of said optical information recording disk.

4,873,680

APPARATUS AND METHOD FOR DETECTING AND COMPENSATING FOR PIT EXTENSION IN AN OPTICAL DISK RECORDING SYSTEM

Chi H. Chung, San Jose; Theodore D. Rees, Mountain View, and Ian Turner, Sunnyvale, all of Calif., assignors to Laserdrive Ltd., Santa Clara, Calif.

Filed Mar. 13, 1987, Ser. No. 25,394
Int. Cl.[4] G11B 7/007
U.S. Cl. 369—59 **15 Claims**



OEM CODE HOLE SIZES

1. In a system for storing encoded binary data bits in an optical recording medium, including encoding means for converting each of said data bits into a code word comprising one or more code bits, writing means for writing said code bits in the form of a series of pits on said optical recording medium by generating write pulses of laser light energy, and reading means for detecting the edge transitions of pits formed on said optical recording medium, the improvement comprising:

medium certification means for determining the pit extension characteristics of said medium, including means for generating one or more test write pulses each having a predetermined on time, said write pulses causing corresponding pits to be formed on a selected segregated areas of said medium during a first time session before the recording of data, and comparator means for detecting the time durational difference between the on time of said predetermined test write pulses and the duration of the leading edge transition to trailing edge transition of the corresponding pit formed on said medium as read by said reading means; and

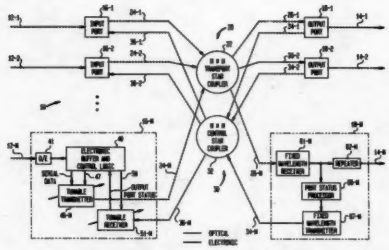
pit extension compensation means for modifying the duration of each subsequent write pulse written on a selected area of said medium other than said selected segregated area during a second time session, as a function of said durational difference detected by said comparator means.

4,873,681

HYBRID OPTICAL AND ELECTRONIC PACKET SWITCH

Edward Arthurs, Summit; Matthew S. Goodman, Belle Mead; Haim Kobrinski, Andover, and Mario P. Vecchi, Morris Plains, all of N.J., assignors to Bell Communications Research, Inc., Livingston, N.J.

Filed Jan. 26, 1988, Ser. No. 147,445
Int. Cl.[4] H04B 9/00
U.S. Cl. 370—3 **12 Claims**



6. A hybrid optical and electronic packet switch for routing data packets from specific incoming optical fiber trunks to specific outgoing optical fiber trunks, said packet switch comprising:

a plurality of output ports connected to said outgoing optical fiber trunks,

a plurality of input ports connected to said incoming optical fiber trunks, said input ports including electronic circuit means for storing said packets and for processing status information received from said output ports,

a first internally collisionless optical network for simultaneously transmitting a plurality of said packets in optical form from specific ones of said input ports to specific ones of said output ports, and

a second optical network for transmitting said status information from said output ports to said input ports so that said input ports can determine when packets may be transmitted to specific output ports without two packets being transmitted to the same output port at the same time,

wherein each of said input ports comprises

an optical-to-electronic converter for converting incoming packets into bit-serial electronic form,

a serial-to-parallel converter for converting said packets from serial to parallel form,

a buffer for storing said packets in parallel form,

decoding means for decoding address information contained in said packets,

a tunable optical transmitter, said optical transmitter being tunable to a specific wavelength based on said address information, and

means for reading said packets from said buffer and for

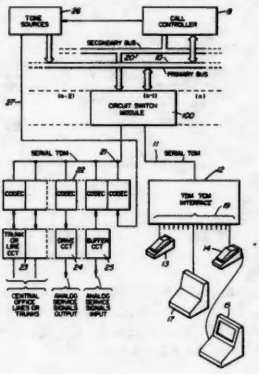
converting said packets into serial form so that said packets can be modulated onto the specific wavelength to which said transmitter is tuned.

4,873,682

DIGITAL KEY TELEPHONE SYSTEM

George F. Irwin, Kanata; Paul J. Smelters; David J. Robertson, both of Ottawa, all of Canada, and Ronald J. Maginley, Ann Arbor, Mich., assignors to Northern Telecom Limited, Montreal, Canada

Filed Nov. 30, 1987, Ser. No. 126,710
Int. Cl.[4] H04Q *11/04*
U.S. Cl. 370—58.1 11 Claims



1. A digital key telephone system for providing communication paths, as directed by a call controller, between digital signal communications (DSC) terminals via line appearances provided by corresponding digital signal ports, the digital key telephone system comprising:

a time division multiplex (TDM) serial transmission path, being connected to a predetermined plurality of said digital signal ports, for providing a predetermined plurality of time division multiplex transmit (TDMT) and receive (TDMR) channels in fixed pair relationship with each of the said digital signal ports, the TDMT and TDMR channels residing in respective transmit and receive serial bit streams, and being of a fixed time slot interval for transmission of a fixed plurality of bit occurrences in excess of a predetermined plurality of m information bits;

a first transmission bus including a plurality of at least m parallel signal paths;

timing means for defining predetermined TDM frame intervals and channel occurrences, in the TDM serial transmission path, and for defining time slot occurrences being a whole number multiple of said channel occurrences during one of said frame intervals, in relation to the first TDM parallel bus, in response to timing signals from the call controller;

a circuit switch module being connected between the TDM serial transmission path and the first transmission bus and comprising:

a module transmission bus including a plurality of m parallel signal paths;

conversion circuit means for transferring the TDMT serial bit stream states of each channel occurrence to one of the first and module transmission buses and for transferring bit states of the m parallel signal paths of the other of said first and module transmission buses to the TDMR serial bit stream during corresponding channel occurrences;

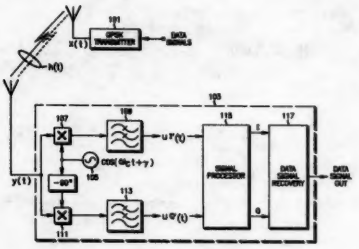
time switch means, being connected between the first transmission bus and the module transmission bus, for storing bit states, from one of the first bus and the module bus said bit states being those occurring during time slot intervals having been defined by the call controller, and transferring the stored bit states to the other of said buses in response to the defined channel occurrences from the timing means.

4,873,683

TDMA RADIO SYSTEM EMPLOYING BPSK SYNCHRONIZATION FOR QPSK SIGNALS SUBJECT TO RANDOM PHASE VARIATION AND MULTIPATH FADING

David E. Borth, Palatine; Chih-Fei Wang, Arlington Heights; Duane C. Rabe, Rolling Meadows, and Gerald P. Labedz, Chicago, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 4, 1987, Ser. No. 128,677
Int. Cl.[4] H04J *3/16*; H04B *1/10*
U.S. Cl. 370—95.1 13 Claims



1. A quadrature phase shift keying (QPSK) time division multiple access (TDMA) radio system conveying a data signal comprising a synchronizing portion and a message portion in a timeslot over a radio channel which introduces multipath distortion and phase variation in the data signal, the system comprising:

means for transmitting a synchronizing portion consisting of a plurality of data bits in a predetermined pattern in only one vector of the data signal;

means for receiving the data signal subjected to multipath distortion and phase variation; and

means, responsive to said one vector synchronizing portion of a received data signal, for compensating the multipath distortion and phase variation of the message portion of said received data signal for the duration of one TDMA timeslot.

4,873,684

METHOD AND APPARATUS FOR MULTIPLEXING OF INPUT SIGNALS HAVING DIFFERING FREQUENCIES AND DEMULTIPLEXING SAME

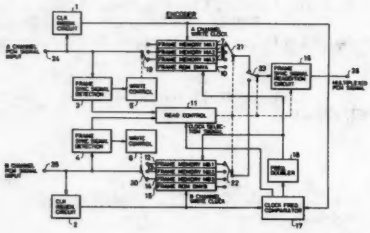
Hirokazu Kobayashi, Gyoda; Yukihiko Miyamoto, Tama; Masaoki Takai, Tokyo; Syuichi Fujisawa, Tokyo, and Hiroshi Miyazawa, Tokyo, all of Japan, assignors to Trio Kabushiki Kaisha and Nippon Hoso Kyokai, both of, Japan

Continuation of Ser. No. 868,036, May 29, 1986, abandoned.
This application Sep. 19, 1988, Ser. No. 246,923
Claims priority, application Japan, May 29, 1985, 60-114357; May 29, 1985, 60-114358; Sep. 18, 1985, 60-204519
Int. Cl.[4] H04J *3/07*
U.S. Cl. 370—102 7 Claims

1. A time division multiplex transmission system for time division multiplexing of a plurality of information signals each having information coded in a predetermined frame format and having either different sampling frequencies or clock signals frequencies, to form a resultant time division multiplexed signal having a predetermined frequency, and transmitting the

resultant time division multiplexed signal by one transmission path, comprising the steps of:

rearranging said plurality of information signals so as to have a time division multiplexed signal format, by selecting a reference signal having a frequency corresponding to a frequency which is at least equal to a product of one of (a) the maximum frequency among said sampling frequencies, or (b) the maximum clock signal frequencies of said plurality of information signal, multiplied by the number of said plurality of information signals;



interposing a dummy signal, which has a length equal to one frame of the predetermined frame format, into a portion of the resultant time division multiplexed signal where the corresponding information signal is unavailable due to the difference in frequencies among the plurality of information signals;

whereby a continuous time division multiplexed signal is produced.

4,873,685

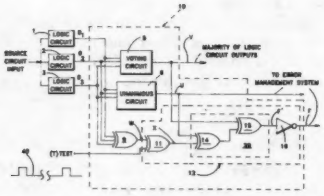
SELF-CHECKING VOTING LOGIC FOR FAULT TOLERANT COMPUTING APPLICATIONS

Hugh L. Millis, Jr., Placentia, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed May 4, 1988, Ser. No. 190,311

Int. Cl.[4] G06F *11/00*

U.S. Cl. 371—36 **11 Claims**



1. An apparatus comprising in combination:

a voting circuit means for producing a voting circuit output signal based upon a majority value of triplicated logic output signals **01**, **02**, and **03**;

a unanimous circuit means for producing a unanimous circuit output signal representing whether or not all of said triplicated logic output signal values are equal or not; and

a self-checking means for monitoring operational validity of said voting and said unanimous circuit means, and said self-checking means, said self-checking, voting, and unanimous circuit means operating independently from triplicated logic circuits producing said triplicated logic output signals, and said self-checking circuit means receiving said output signals **01**, **02**, and **03**, said voting circuit output signal, and said unanimous circuit output signal.

4,873,686

TEST ASSIST CIRCUIT FOR A SEMICONDUCTOR DEVICE PROVIDING FAULT ISOLATION

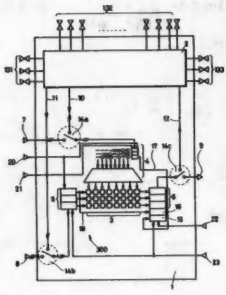
Tetsuo Tada, and Tsuyoshi Yamada, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jan. 11, 1988, Ser. No. 142,557

Claims priority, application Japan, Jan. 14, 1987, 62-6982

Int. Cl.[4] G06F *11/00*

U.S. Cl. 371—22.4 **12 Claims**



7. In a test assist circuit for a semi-conductor device, said test assist circuit being contained in said semi-conductor device, said semi-conductor device having a memory circuit for storing multi-bit data and a logic circuit for independently testing said memory circuit, disconnecting means for disconnecting said memory circuit form said logic circuit, addressing means for addressing said memory circuit on the basis of a multiple-bit address signal, input data storage means for storing multiple-bit input data and supplying the same to said memory circuit, and output data storage means for storing multiple-bit data outputting from said memory circuit,

the improvement wherein,

said output data storage means further includes,

means for storing at least one of at least single-bit information within said multiple-bit address signal and at least single-bit information contained within said multiple-bit input data, and

means for controlling said output data storage means such that,

said at least one of (a) said at least single-bit information contained within said multiple-bit address signal and (b) said at least single-bit information contained within said multiple-bit input data is outputted with said multiple-bit data outputted from said memory circuit.

4,873,687

FAILING RESOURCE MANAGER IN A MULTIPLEX COMMUNICATION SYSTEM

Wendy W. Breu, Mountain View, Calif., assignor to IBM Corporation, Armonk, N.Y.

Filed Oct. 5, 1987, Ser. No. 105,771

The portion of the term of this patent subsequent to Mar. 28, 2006, has been disclaimed.

Int. Cl.[4] G06F *11/32*; H04B *3/46*

U.S. Cl. 371—8.2 **11 Claims**

1. A method to analyze errors in a system, the system having a plurality of resources with replaceable units, a display, a processor, and memory means for storing decision trees, data structures, failing resource manager tasks and error analysis tasks, the resources including a diagnostics card having a processor and memory means for storing resource analysis tasks, and communication resources, the method comprising the steps of:

(a) testing said resources intermittently by said error analysis tasks invoking a card analysis task on said diagnostics card

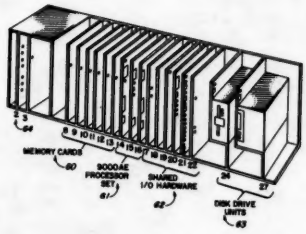
to test for an error in said communication resources in said system;

(b) detecting an error and invoking an appropriate error analysis tasks to further diagnose the cause of said error;

(c) isolating said error to a replaceable unit by automatically traversing said decision trees in said error analysis tasks on said diagnostics card;

(d) writing data to record said error in said data structure in said memory of said system;

(e) retesting said replaceable unit by automatically traversing said decision trees in said error analysis tasks on said diagnostics card;



(f) removing said replaceable unit from service if said retest detects said error;

(g) retesting said replaceable unit by automatically traversing said decision trees in said error analysis tasks on said diagnostics card to detect a return to normal operation;

(h) returning said replaceable unit to service if said error is not detected; and

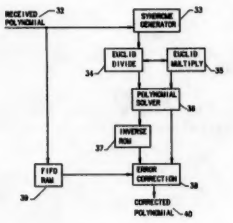
(i) displaying a message indicative of said error on said display of said system.

4,873,688

HIGH-SPEED REAL-TIME REED-SOLOMON DECODER

Gary K. Maki; Kelly B. Cameron, and Patrick A. Owsley, all of Moscow, Id., assignors to Idaho Research Foundation, Moscow, Id.

Filed Oct. 5, 1987, Ser. No. 105,401
Int. Cl.[4] G06F *11/10*
U.S. Cl. 371—37.1 **13 Claims**



1. A Galois Field decoder for correcting an error in a received message comprising:

a. means for calculating a magnitude polynomial representing a portion of a magnitude of said error in said received message;

b. means for calculating a location polynomial representing a location of said error in said received message, said location polynomial having a first derivative polynomial;

c. means for calculating the first derivative polynomial of said location polynomial, said first derivative having a plurality of non-zero values, each of said non-zero values having an inverse;

d. means for calculating said inverse values:

e. means for multiplying each of said inverse values with a value of said magnitude polynomial for forming a correction polynomial; and

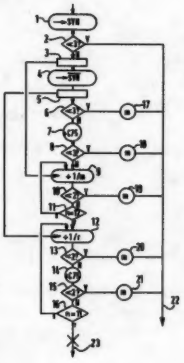
f. means for correcting said received message by combining the received polynomial with the correction polynomial.

4,873,689

METHOD AND APPARATUS FOR COLLECTING ERRORS IN THE DIGITAL DATA OF A TELEVISION SIGNAL

Daniel Pellerin, Versailles, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 6, 1988, Ser. No. 203,405
Claims priority, application France, Jun. 16, 1987, 87 08370
Int. Cl.[4] G06F *11/00*
U.S. Cl. 371—37.1 **5 Claims**



1. A method of correcting in a television receiver errors in a number less than four in digital data received with the television signal and coded according to a cylic so-called Golay code comprising a word of 12 bits representing a message and a word of 11 bits which is the residue of the Euclidian division of the message by a word designated as "generating polynome", and which provides for a redundance, in which there is started to establish from the code as received a particular word designated as "syndrome", which represents the difference between the redundance as received and that which would have to correspond to the message received, and permits of affirming that the message does not contain errors if the syndrome comprises at most three "1" bits, that is to say that it differs by at most three bits from that which would be obtained in the absence of errors, characterized in that, if the syndrome comprises more than three bits, a series of operations are carried out, each of which can provide the solution, in which event the following operations are not carried out, and which consists of the following tests:

from the redundance word received, for which there are two corresponding messages capable of forming with it a correct code, it is determined for each of the two corresponding message words whether it differs by more than three bits from the message word received, in which event this corresponding word is the correct one;

each of the twelve bits of the message word received is modified in turn and each time it is determined whether the syndrome of the complete code received provided with the modified message comprises more than two bits, in which event the modified message word received is the correct one;

each of the bits of the redundance word received is modified in turn and it is determined each time by each of the two corresponding message words whether it differs by more

than two bits from the message word received, in which event this corresponding message word is the correct one.

4,873,690

OPTICAL SWITCH

Michael J. Adams, Ipswich, United Kingdom, assignor to British Telecommunications public limited company, Great Britain

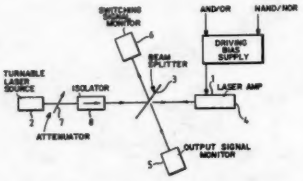
PCT No. PCT/GB87/00905, § 371 Date Aug. 10, 1988, § 102(e) Date Aug. 10, 1988, PCT Pub. No. WO88/04791, PCT Pub. Date Jun. 30, 1988

PCT Filed Dec. 14, 1987, Ser. No. 230,837

Claims priority, application United Kingdom, Dec. 15, 1986, 8629871

Int. Cl.[4] H01S *3/30*

U.S. Cl. 372—8 **9 Claims**



1. An optical switch comprising:

a semi-conductor or optical amplifier having optical input and output ports located at a common end of an amplifier cavity,

means for coupling a detuned optical input switching signal to the amplifier, and

means for applying a driving electrical current to the amplifier, which driving current is selected to have either one of at least two different values, at a first value of which driving current the optical amplifier is operated as an AND/OR logic gate for input optical signals and at a second value of which driving current the optical amplifier is operated as a NAND/NOR logic gate for input optical signals.

4,873,691

WAVELENGTH-TUNABLE SEMICONDUCTOR LASER

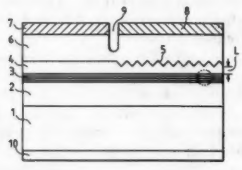
Kazuhisa Uomi, Hachioji, Japan; Shinji Tsuji, Red Bank, N.J.; Shinji Sakano, Hachioji, Japan; Makoto Okai, Koganei, Japan, and Naoki Chinone, Chofu, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 27, 1988, Ser. No. 224,726

Claims priority, application Japan, Jul. 31, 1987, 62-190040

Int. Cl.[4] H01E *3/19*

U.S. Cl. 372—20 **21 Claims**



1. In a wavelength-tunable semiconductor laser comprising an active part having an active layer, and an external waveguide part having a diffraction grating, the improvement comprising wherein the external waveguide part includes a quantum well structure with at least one quantum well layer in addition to said diffraction grating, the quantum well structure being optically coupled to the diffraction grating, the external waveguide part including means for applying an electric field to the quantum well structure.

4,873,692

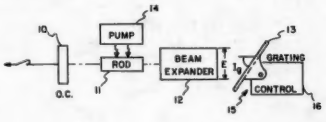
PULSED TUNABLE SOLID STATE LASER

Bertram C. Johnson, Sunnyvale; John C. DiFonzo, San Mateo, and Richard L. Herbst, Palo Alto, all of Calif., assignors to Spectra-Physics, San Jose, Calif.

Filed Aug. 12, 1988, Ser. No. 231,726

Int. Cl.[4] H01S *3/10*

U.S. Cl. 372—20 **35 Claims**



1. An apparatus, comprising:

a solid state laser medium, coupled with an energy source, for amplifying a beam of coherent radiation along an optical path;

a beam expander mounted along the optical path, having a first side facing the laser medium and a second side, for expanding the beam incident at the first side and transmitted out the second side in a first direction perpendicular to the optical path and for focusing a beam incident at the second side and transmitted out the first side;

a grating, mounted along the optical path facing the second side of the beam expander at an adjustable angle of incidence for reflecting the expanded beam incident on the grating, the grooves in the grating being essentially perpendicular to the first direction and to the optical path; and

means, connected to the grating, for adjusting the adjustable angle of incidence.

4,873,693

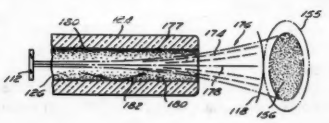
APPARATUS AND METHOD FOR SUPPRESSING DIFFRACTION RINGS IN A LASER

Benjamin H. Cook, Jr., Fallbrook, Calif., assignor to Melles Griot San Marcos Company, Carlsbad, Calif.

Division of Ser. No. 108,550, Oct. 14, 1987, Pat. No. 4,827,484. This application Nov. 30, 1988, Ser. No. 277,883

Int. Cl.[4] H01S *3/00*

U.S. Cl. 372—33 **2 Claims**



1. A method of manufacturing a gas laser having an envelope for containing a laser gas and a tube in said envelope which surrounds an optical path, said method comprising flowing a substance through said tube to roughen interior surfaces of said tube such that diffraction rings in light output from said laser are suppressed.

4,873,694

SWITCHING CONFIGURATION FOR PCM TIME DIVISION MULTIPLEX TELEPHONE EXCHANGE HAVING A CENTRAL SWITCHING NETWORK AND INDIVIDUAL SUB-SWITCHING NETWORKS

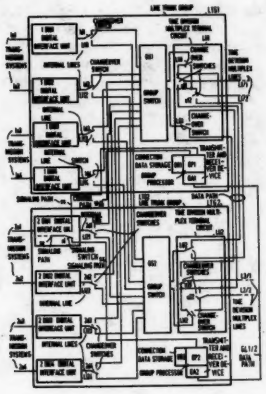
Lothar Schmidt, Fuerstenfeldbruck, and Alfred Jugel, Geretsried, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 22, 1988, Ser. No. 247,998

Claims priority, application Fed. Rep. of Germany, Oct. 6, 1987, 3733765

Int. Cl.[4] H04Q *11/04*

U.S. Cl. 370—58.1 12 Claims



1. A switching system for a centrally controlled PCM time division multiplex telephone exchange, in which a central switching network provides connections and a central processor provides control and switching signal processing, and including a plurality of individual line groups having a sub-switching network for external connection of interexchange trunks or subscriber lines and having an individual control unit for receiving switching signals from said lines, for switching signal preprocessing and for switching signal transfer to the central processor and for switching signal transmission to said lines, and in which said plurality of individual line groups of the sub-switching networks are connected internally via groups of link lines groupwise separated to switching network connections of the central switching network, and in which the line groups are assigned pairwise to each other, and within each of said line groups line units provide external connection of said subscriber lines and/or said interexchange trunks; and wherein a particular line group is connected via internal lines to the sub-switching network of a first of two groups is additionally connectable to the sub-switching network of the other of said two groups, a partner line group, whereupon for connections, via a line unit of the first line group the corresponding switching signal processing and sub-switching network setting is controlled by the individual control unit of the second line group, the improvement comprising:

means for switching over said internal lines within the line group leading from a line system within one of said pairwise assigned line groups to its sub-switching network within a diversion phase individual to the connection to the sub-switching network of the other said line group, such that within said diversion phase, changeover switching is limited to internal lines which are not busy through release of said connection, to said internal lines via which said connections are through-connected to subscribers where a called party has answered internal lines seized by said connections, in which the process of establishing one of said connecting are completed, but wherein the called party has not yet answered, and such that with t he completion of the diversion phase, the connections in the process of being set up are released.

4,873,695

LASER WITH DISCHARGE IN A TURBULENT TRANSVERSE FLOW

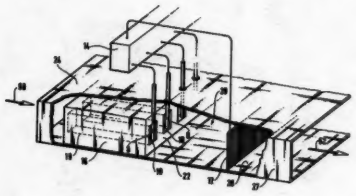
Henri Brunet, L'Hay Les Roses; Michel Mabru, Bures Sur Yvette, and Philippe Chauvet, Chatenay Malabry, all of France, assignors to Compagnie Generale D'Electricite, Cedex, France

Filed Jul. 27, 1988, Ser. No. 224,626

Claims priority, application France, Jul. 27, 1987, 87 10629

Int. Cl.[4] H01S *3/02*

U.S. Cl. 372—58 10 Claims



1. A laser with electrical discharge in a turbulent transverse flow, the laser comprising:

optical means (2) for causing light radiation to circulate or oscillate;

a discharge chamber (20) having a length between an upstream face (10, 22) and a downstream face (12) which extends along a width and a height of said chamber;

circulation means (18, 28, 30) for circulating an active gas in said discharge chamber and forming a subsonic turbulent flow from said upstream face to said downstream face; and

electrical means (8, 12, 14) for establishing at least one electric discharge in said active gas inside said discharge chamber between at least one upstream electrode (8) and a downstream electrode (12) situated in said upstream and downstream faces (10, 20; 12) respectively, so that said discharge is made uniform and/or stable by said turbulent flow, thereby electrically exciting said gas so as to enable said gas to amplify said light radiation;

said circulation means comprising:

a plurality of insertion passages through said upstream face (10, 22) enabling active gas to be inserted into said discharge chamber (20), each of said passages corresponding to a discharge module which is the portion of said discharge chamber in which the gas inserted via said orifice circulates, said module having an upstream surface and a downstream surface which are those portions of said upstream and downstream faces respectively that are occupied by said module;

evacuation passages (13) in said downstream face to enable said active gas to be evacuated from said chamber; and

pressure maintaining means (30) for maintaining a pressure ratio on insertion of more than one, said ratio being the ratio between the pressure of said active gas upstream from said insertion passage relative to the working pressure of said gas in said discharge chamber;

the improvement wherein each of said insertion passages is an injection orifice (10) occupying a minority fraction of the area of said upstream surface and surrounded by one or more reserved portions occupying the remainder of said upstream face in such a manner that the gas injected via said orifice forms a corresponding diverging jet (40) leaving one or more corner spaces to one side constituting portions of the corresponding said discharge module (16);

said injection orifice being provided with one of said up-

stream electrodes (8) to form a discharge (44) in said diverging jet (10) starting at the origin thereof; and

at least a portion of at least one of said downstream electrodes (12) being distributed in said downstream surface in order to diffuse said electrical discharge throughout the volume of the jet.

4,873,696

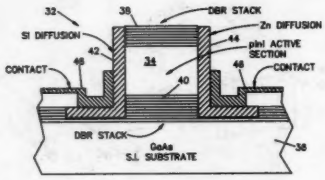
SURFACE-EMITTING LASERS WITH PERIODIC GAIN AND A PARALLEL DRIVEN NIPI STRUCTURE

Larry A. Coldren, Santa Barbara; Jeffery W. Scott, Isal Vista, and Ran H. Yan, Goleta, all of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Oct. 31, 1988, Ser. No. 265,146

Int. Cl.[4] H01S *3/19*

U.S. Cl. 372—96 **19 Claims**



1. A Distributed-Bragg-Reflector semiconductor laser comprising:

(a) a nipinipi . . . gain-producing active section comprised of a plurality of gain segments disposed at periodic intervals with respect to the wavelength of an intended operating frequency of the laser;

(b) a pair of Distributed-Bragg-Reflector stacks disposed at the respective ends of said nipinipi . . . active section; and,

(c) electrode means operably connected to said nipinipi . . . active section in electrical contact therewith for applying a driving current to said nipinipi . . . active section.

4,873,697

NARROWBAND LASER TRANSMITTER HAVING AN EXTERNAL RESONATOR FROM WHICH THE OUTPUT POWER CAN BE TAKEN

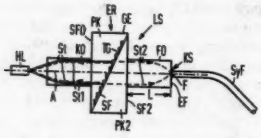
Klaus M. Haeussler, Munich; Julius Wittmann, Oberhaching; Gisela Gaukel, Munich, and Franz Auracher, Baierbrunn, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jul. 23, 1987, Ser. No. 76,839

Claims priority, application Fed. Rep. of Germany, Sep. 29, 1986, 3632998

Int. Cl.[4] H01S *3/08*

U.S. Cl. 372—108 **16 Claims**



1. In a narrowband laser transmitter comprising a semiconductor laser having a laser emission output and an external optical resonator being coupled to the semiconductor laser wherein an output power of the transmitter can be taken from the resonator, the improvements comprising said resonator being composed of an optical means being arranged in the beam path of the laser emission output of the semiconductor laser for conducting a first part of the laser emission output back to the semiconductor laser and directing a second part of the laser emission output along a separate beam path having a beam axis, and a focussing optic composed of a gradient lens having a length along a lens axis being selected with a focus point of the lens coinciding with an end face of said gradient lens, said gradient lens being disposed in said beam path with the lens axis coinciding with the beam axis, said focus point on said end face forming a coupling location at which said second part can be taken as the output power of said transmitter, said optical means including grating means.

4,873,698

INDUCTION FURNACE CRUCIBLE

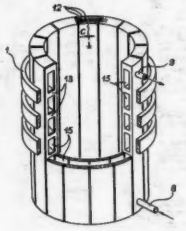
Roger Boen, Pont Saint Esprit, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Sep. 26, 1988, Ser. No. 249,122

Claims priority, application France, Oct. 6, 1987, 87 13778

Int. Cl.[4] H05B *5/00*

U.S. Cl. 373—156 **6 Claims**



1. A crucible for use in an induction furnace comprising

a bottom wall means;

a circumferential sidewall composed of a plurality of longitudinally extending sidewall elements (12) made from electrically conductive material, each of said sidewall elements having circumferentially spaced apart transverse faces and duct means traversing therethrough in open fluid communication between said spaced apart transverse faces, aid wall elements being arranged relative to each other to place said duct means of each wall in aligned open facing relation with said duct means of those wall elements that are adjacent thereto;

an electrically insulating joint interposed in sealing relation between each of said adjacent wall elements, each of said insulating joints having duct openings therethrough in open registry with said ducts presented by adjacent wall elements to form therewith at least one channel interconnected between said crucible wall elements for carrying a cooling liquid;

a cooling liquid supply means for admitting coolant into said channel; and

a cooling liquid discharge means for discharging fluid from said channels.

4,873,699

METHOD AND DEVICE FOR CODING AND DECODING A BROADBAND TRANSMISSION

Alain Saussier, Argenteuil, and Bruno R. Sebilet, Rueil Malmaison, both of France, assignors to Societe Nationale D'Etude et de Construction de Moteurs D'Aviation, Paris, France

Filed Mar. 18, 1988, Ser. No. 170,232

Claims priority, application France, Mar. 19, 1987, 87 03778

Int. Cl.[4] H04K *1/00*

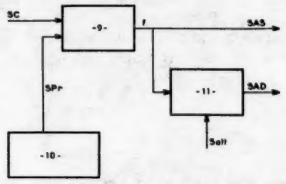
U.S. Cl. 375—1 **5 Claims**

3. In a communications system comprising a transmitter and

at least one receiver, means for coding and decoding a spread spectrum transmission comprising:

in the transmitter, a first code generator for generating a transmission code consisting of a pseudo-random binary sequence of period T and composed of two alternating pseudo-random half-sequences of period T/2 and with nil or almost nil cross-correlation, and a modulator controlled by said transmission code to modulate the real signal to be transmitted and thereby generate a coded signal;

and in said at least one receiver, a second code generator for generating a reception code which is identical to said transmission code except that one of the half-sequences of said reception code is shifted in a circular rotational sense relative to the corresponding half-sequence of the transmission code, a demodulator controlled by said reception code to demodulate said coded signal received from said transmitter and to derive said real signal, and a synchronization device for synchronizing said second code generator with said first code generator by correlation of said reception code with said received coded signal to derive sum and difference synchronization control signals, said device comprising



a single correlator which receives said received coded signal and said reception code generated by the second code generator and is operative to deliver said sum synchronization control signal, and

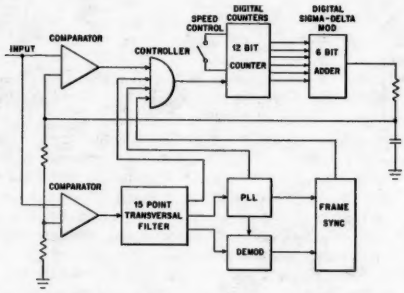
a synchronous detector which receives said sum control signal and an alternation signal and is operative to deliver said difference synchronization control signal.

4,873,700

AUTO-THRESHOLD/ADAPTIVE EQUALIZER

Hee Wong, San Jose, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Oct. 14, 1987, Ser. No. 108,718
Int. Cl.[4] H04L *25/06*
U.S. Cl. 375—76 **10 Claims**



1. An auto-threshold circuit that allows a signal receiver to detect an input signal at different amplitude levels, the input signal comprising data and a carrier waveform, the auto-threshold circuit comprising

window comparator means for slicing the input signal at predetermined levels;

an auto-threshold controller which receives the sliced input signal and provides an output voltage representative of the sliced input signal;

a digital loop filter which receives the output voltage of the auto-threshold controller and generates a corresponding binary signal; and

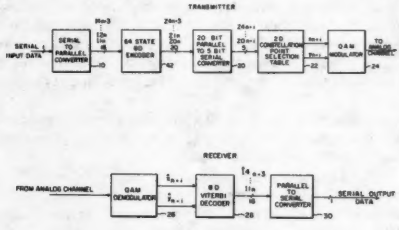
converter means for converting the binary signal to a single-bit, pulse density modulated signal having a predetermined sampling frequency whereby the auto-threshold circuit provides selected data as an ouput.

4,873,701

MODEM AND METHOD FOR 8 DIMENSIONAL TRELLIS CODE MODULATION

Steven A. Tretter, Silver Spring, Md., assignor to Penril Corporation, Rockville, Md.

Filed Sep. 16, 1987, Ser. No. 97,448
Int. Cl.[4] H04B *14/06*
U.S. Cl. 375—27 **13 Claims**



1. A modem for modulation-demodulation of received analog signals including a demodulator comprising:

receiving means for receiving analog signals comprised of four 2D points;

means for storing a plurality of ideal 2D points comprising a twenty point 2D signal constellation, said twenty point 2D signal constellation comprised of four 2D subsets of points;

slicing means connected to said receiving means including a set of rules for finding the best ideal 2D point in each of said four 2D subsets to each of said received four 2D points by locating the ideal 2D point closest in Euclidean distance;

first combining means connected to said slicing means for combining into pairs each of said ideal 2D points to form 4D points in each of eight 4D subsets and selecting one of said pairs of ideal 2D points in each of said 4D subsets to represent the best 4D point in each of said 4D subsets;

second combining means connected to said first combining means for combining into pairs each of said best eight 4D points to form sixteen 8D points and comparing said pairs of four 4D points with a set of allowed points in each of sixteen 8D subsets and selecting one of said 8D points to represent the best 8D point in each of the sixteen 8D subsets;

decoding means connected to said second combining means for extending a decoder trellis for implementing a Viterbi algorithm and generating as output 20 Z-bits corresponding to the best 8D point;

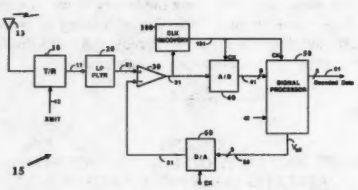
converting means connected to said decoding means for converting said 20 Z-bits into a stream of 16 data bits; and

sending means connected to said converting means for sending said data bits to a data sink.

4,873,702
METHOD AND APPARATUS FOR DC RESTORATION IN DIGITAL RECEIVERS

Ran-Fun Chiu, 1295 Montclaire Way, Los Altos, Calif. 94022

Filed Oct. 20, 1988, Ser. No. 260,288
Int. Cl.[4] H04L 25/06
U.S. Cl. 375—76 7 Claims



1. In a digital communication system between a local receiver and between a plurality of remote data sources, each source selectively generating a digitially modulated signal having X predetermined amplitude levels, said remote sources providing a short preamble signal immediately prior to the transmission of one of said digitally modulated signals, said preamble signal characterized by a coding that produces multiple cycles of equal amplitude level excursions in said receiver, apparatus at said receiver for removing any dc offset voltage, V_{off}, from said digitally modulated signal, said apparatus comprising:

analog summing means having first and second inputs, said summing means for receiving one of said digitally modulated signals at said first input;

A/D converting means having a sampling interval T for periodically converting said digitally modulated signals from said summing means into a digitally formatted signal;

digital processing means for receiving said digitally formatted signal and for generating a dc offset voltage at time intervals nT, where n is an integer, said dc offset voltage being equal to

$$V_{off}n+1=V^n(1/\alpha)V_e n,$$

where;

V^n=the offset voltage at time nT;

$V_e n$=the offset voltage at time nT as measured by the voltage difference between said digitally formatted signal and the closest normalized coding level; and

α=a predetermined number,

such that at time n=1, V^*, the initial offset voltage, is set equal to the average amplitude level during at least one of said multiple cycles during said preamble period; and

means for feeding back said dc offset voltage to said second input, said summing means subtracting said offset voltage from said digital modulated signal.

4,873,703
SYNCHRONIZING SYSTEM

Douglas Crandall, Berkeley; Vicente Cavanna, Loomis; Pradip Shankar, Citrus Heights, all of Calif., and Rasmus Nordby, Horsholm, Denmark, assignors to Hewlett-Packard Company, Palo Alto, Calif.

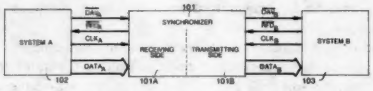
Continuation-in-part of Ser. No. 11,352, Jan. 30, 1987, abandoned, which is a continuation-in-part of Ser. No. 781,868, Sep. 27, 1985, abandoned. This application Aug. 19, 1988, Ser. No. 235,746
Int. Cl.[4] H04L 7/00
U.S. Cl. 375—118 24 Claims

1. A synchronizing system comprising:

first system means having data synchronized with a first clock signal;

second system means having the data to be synchronized with a second clock signal being independent from the first clock signal; and

synchronizer means coupled to the first and second system means for transferring the data from the first system means to the second system means, the synchronizer means having a two port memory which receives the data from the

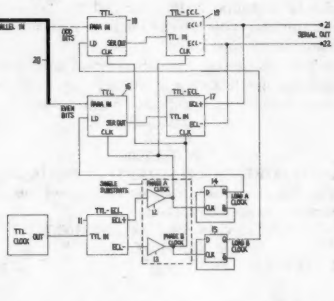


first system means at a first address whose succeeding addresses are encoded in a unit distance code by determining that the two port memory is not full, and transmits the data to the second system means from the same address to the first address and the succeeding addresses by determining that the two port memory is not empty.

4,873,704
METHOD AND APPARATUS FOR EFFECTIVELY DOUBLING THE OPERATIONAL SPEED OF SELECTED DIGITAL CIRCUITS

Jack E. Randall, Savage, Minn., assignor to CPT Corporation, Minneapolis, Minn.

Filed May 9, 1988, Ser. No. 191,707
Int. Cl.[4] H03K 3/02
U.S. Cl. 377—47 14 Claims



1. A high speed parallel to serial converter for converting parallel multibit digital words into a plurality of serial data streams, comprising;

a plurality of shift registers, each shift register having applied thereto in parallel, selected parallel bits of said multibit digital words,

a digital clock operating at a first frequency,

means for effectively doubling the first frequency of said digital clock by producing a plurality of digital waveforms, each waveform having a frequency equal to said first frequency and each waveform being the inverse of the other waveform with a predetermined phase relationship between said waveforms; and

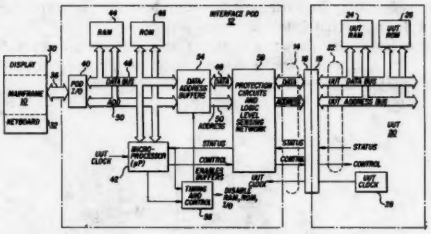
means for selectively applying each of said waveforms to selected ones of said shift registers to alternately operate said shift registers, whereby said parallel multibit digital words are converted into a plurality of serial data streams at a data rate effectively equal to twice said first frequency.

4,873,705

METHOD OF AND SYSTEM FOR HIGH-SPEED, HIGH-ACCURACY FUNCTIONAL TESTING OF MEMORIES IN MICROPROCESSOR-BASED UNITS

Craig V. Johnson, Everett, Wash., assignor to John Fluke Mfg. Co., Inc., Everett, Wash.

Filed Jan. 27, 1988, Ser. No. 148,901
Int. Cl.[4] G06F *11/00*
U.S. Cl. 371—21.2 24 Claims



1. A method of functionally testing a memory having a plurality of addressable cells, comprising the steps of:

(a) writing a pseudorandom sequence of bits into a predetermined number of consecutively-addressed memory cells to provide a reference block;

(b) replicating said reference block by iteratively reading said pseudorandom sequence of bits and writing said bits into next successive blocks in a first direction until all of the memory cells are written.

(c) complementing the contents of said reference block;

(d) again replicating said reference block by iteratively reading complemented bits of said pseudorandom sequence and writing said complemented bits into next successive blocks in said first direction until all of the memory cells are written;

(e) sequentially reading each cell in a second direction opposite said first direction, complementing the data therein, and writing said complemented data back into said cell;

(f) again reading each cell in said first direction and comparing said complemented data with said pseudorandom sequence of bits to detect differences, and, in response,

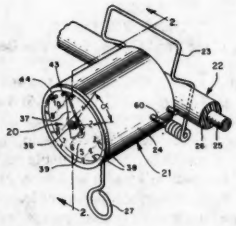
(g) identifying any memory faults.

4,873,706

ELECTROMECHANICAL PULSE COUNTER

Edmund O. Schweitzer, Jr., 2433 Center St., Northbrook, Ill. 60062

Filed Mar. 9, 1988, Ser. No. 166,048
Int. Cl.[4] G06M *3/14, 1/10*
U.S. Cl. 377—85 9 Claims



1. A bidirectional electromechanical counter for counting up in response to applied up-count current pulses, and down in response to applied down-count current pulses, comprising:

armature means mounted for movement in forward and reverse directions to successive counting positions and responsive to a momentarily applied magnetic field to develop a pair of magnetic poles aligned with the axis of magnetization of the applied field;

forward magnetizing means responsive to a first one of the up-count current pulses for momentarily applying a magnetic field to said armature to establish a pair of magnetic poles therein;

reverse magnetizing means responsive to a first one of the down-count current pulses for momentarily applying a magnetic field to said armature to establish a pair of magnetic poles therein;

indexing means for applying a magnetic field to said armature which coats with said established magnetic poles to move said armature to a succeeding counting position in the forward direction in response to magnetic poles established by said forward magnetizing means, and to a succeeding counting position in the reverse direction in response to magnetic poles established by said reverse magnetizing means;

each of said magnetizing means being subsequently responsive to a second one of the applied current pulses for momentarily applying a magnetic field to said armature to establish a subsequent pair of magnetic poles therein;

said magnetic field applied by said indexing means subsequently coacting with each said subsequently established magnetic poles to move said counting armature to a succeeding counting position in the respective direction; and

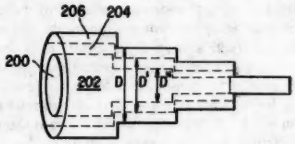
indicator means mechanically coupled to said armature for indicating the number of current pulses applied to the counter.

4,873,707

X-RAY TOMOGRAPHY PHANTOMS, METHOD AND SYSTEM

Douglas D. Robertson, Waltham, Mass., assignor to Brigham & Women's Hospital, Boston, Mass.

Filed Sep. 11, 1987, Ser. No. 95,191
Int. Cl.[4] A61B *6/00*
U.S. Cl. 378—18 14 Claims



1. A phantom for simulating an existing structure, comprising:

a hollow body of a solid material, wherein internal and external surfaces of said hollow body comprises a plurality of cylindrical sections of multiple distinct radii in substantially abutting end-to-end relationship; said material having high-energy absorption characteristics substantially similar to those of the existing structure.

4,873,708

DIGITAL RADIOGRAPHIC IMAGING SYSTEM AND METHOD THEREFOR

Dominic A. Cusano, and George E. Possin, both of Schenectady, N.Y., assignors to General Electric Company, Milwaukee, Wis.

Filed May 11, 1987, Ser. No. 48,236
Int. Cl.[4] G01N *23/04*
U.S. Cl. 378—62 29 Claims

1. A digital radiographic image recording system which comprises:

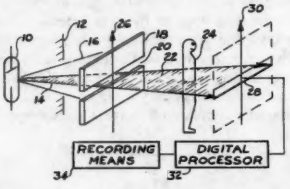
(a) a movable scintillator body having a dense, self-support-

ing and substantially void-free single flat layer configuration which is substantially transparent to the optical radiation emitted by said medium, said scintillator body comprising a polycrystalline scintillator ceramic with a high X-ray absorption value and a material density of at least 99% so that substantially all X radiation impinging thereon will be converted therein to optical radiation without excessive scattering and loss of the converted optical radiation,

(b) a stationary X-ray source to expose said scintillator body to an X-ray fan beam moving in a linear non-arcuate travel direction after passage through an object,

(c) a photodetection member positioned physically contiguous with said moving scintillator body and movable therewith so that both scintillator body and photodetection member move synchronously together with the moving x-ray fan beam in the same linear non-arcuate travel direction for conversion of said moving fan beam to an optical image for simultaneous detection of said optical image in a point-by-point and line-by-line manner,

(d) said movable photodetection member having a plurality of charge transfer devices arranged in electrically con-



nected columns and rows, said columns being aligned in the same linear non-arcuate travel direction as the moving X-ray fan beam while said rows being aligned substantially transverse thereto in order to also synchronously shift the signals being generated by optical radiation impinging on the individual charge transfer device located in the same column in the opposite travel direction to the travel direction of said moving photodetection member and with said synchronous signal shifting being carried out by a time delay and integration mode of operation to form an electrical analog representation of said optical image without experiencing substantial optical attenuation, the pixel arrangement in said photo-detection member also being unbroken so that all impinging optical radiation will be collected, the synchronous signal shifting further being carried between adjoining charge transfer devices such that signals are shifted from a device having received optical radiation to the next adjoining device at the same velocity rate as the physical movement, and

(e) digital processing means for immediately converting said electrical analog representation of said optical image to a recorded digital representation thereof with higher quantum detection efficiency, resolution and contrast.

4,873,709

X-RAY GENERATOR WITH GROOVED ROTARY ANODE

Shuzo Hattori, 42-1, Oaza Nagakute Aza Musashizuka, Nagakute-cho, Aichi-gun, Aichi-ken; Takashi Tagawa, Nara, and Motomu Asano, Nagoya, all of Japan, assignors to Meitec Corporation, Nagoya and Shuzo Hattori, Aichi, both of, Japan

Filed Jul. 18, 1988, Ser. No. 220,087

Claims priority, application Japan, Jul. 24, 1987, 62-186115; Jul. 24, 1987, 62-186116

Int. Cl.[4] H01J *35/10*

U.S. Cl. 378—142 **3 Claims**

1. An X-ray generator comprising:

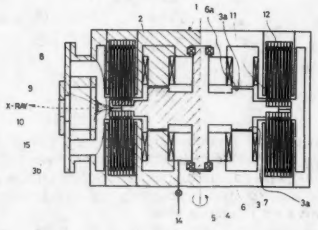
a vacuum vessel;

a cathode disposed in said vacuum vessel for emitting an electron beam;

a plurality of stators constituting an electric motor and disposed within said vacuum vessel for generating rotating magnetic fields;

a disk-shaped anode rotatable about a vertical axis upon reception of the rotating magnetic fields generated from said stators and operable to radiate an X-ray upon reception of the electron beam emitted from said cathode, said disk-shaped anode having a groove formed in the underside along the periphery thereof where the electron beam from said cathode is focused;

a plurality of rotary fins mounted on said disk-shaped anode for dissipating the heat generated in the groove upon radiation of an X-ray;



a plurality of fixed fins mounted within said vacuum vessel in opposed relation to said rotary fins and operable to receive the heat transferred from said rotary fins and dissipate the heat to the outside of said vacuum vessel;

first exhaust port means communicating with a first space defined between said cathode and said anode;

second exhaust port means communicating with a second space defined between said rotary fins and said fixed fins;

gas inlet port means for introducing gas into said second space at a predetermined flow rate;

a first vacuum pump mounted on said first exhaust port means for producing a high vacuum in said first space; and

a second vacuum pump mounted on said second exhaust port means for producing a soft vacuum in said second space in response to the flow rate of gas flown into said second space.

4,873,710

PATIENT SUPPORT

David B. Lotman, 13175 Sand Grouse Ct., Palm Beach Gardens, Fla. 33418

Filed Jan. 15, 1988, Ser. No. 144,469

Int. Cl.[4] A61G *7/10*; A47C *27/10*; A61B *6/04*

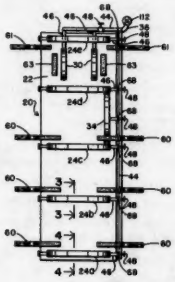
U.S. Cl. 378—177 **32 Claims**

1. A support for a patient to be x-rayed, said support having a plurality of spaced apart elongated inflatable runners adapted to lift portions of the patient's body, said support comprising;

a generally flat support surface having at least one substantially U-shaped inflatable runner means, said U-shaped runner means comprising substantially parallel portions and at least one substantially perpendicular portion; and,

connection means for placing said inflatable runner means in fluid connection with fluid supply means, whereby inflation of said runner means lifts an adjacent portion of the

patient from the support surface so as to permit the insertion of an x-ray cassette beneath said portion of the patient, above the support surface, in an area bounded by said substantially U-shaped runner means.



4,873,711

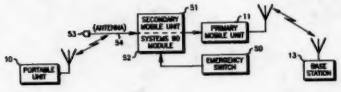
METHOD AND APPARATUS FOR REMOTE TALK/LISTEN COMMUNICATION SYSTEM

Teddy P. Roberts, Fort Wayne, Ind., and Walter J. Rozanski, Jr., Hurst, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation-in-part of Ser. No. 917,923, Oct. 10, 1986, Pat. No. 4,748,685. This application Jan. 5, 1987, Ser. No. 947,155

Int. Cl.[4] H04B *1/40*

U.S. Cl. 379—58 9 Claims



9. A method of controlling communications between a portable transceiver and a vehicle mounted transceiver, comprising the steps of:

in the vehicle mounted transceiver

(a) periodically transmitting a range burst signal;

(b) monitoring for receipt of an acknowledge signal following transmission by said vehicle mounted transceiver of a message to said portable transceiver;

(c) transmitting a missed message signal when reception of said acknowledge signal fails to occur within at least a predetermined period of time;

in the portable transceiver

(d) monitoring for receipt of said range burst

(e) providing an out-of-range signal when reception of said range burst signal fails to occur within at least a predetermined period of time following said portable transceiver's last reception of a range burst signal;

(f) monitoring for receipt of said missed message signal;

(g) providing a missed message alert upon receiving said missed message signal.

4,873,712

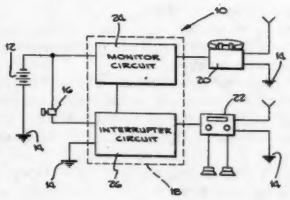
TELEPHONE CONTROLLED INTERRUPTER CIRCUIT

Carmen R. Porco, Canoga Park, Calif., assignor to Alliance Research Corporation, Chatsworth, Calif.

Filed May 19, 1988, Ser. No. 196,954

Int. Cl.[4] H04Q *7/04;* H04M *11/00*

U.S. Cl. 379—58 4 Claims



1. In a vehicle equipped with a telephone, an audio system and a battery for powering the telephone and audio system, a circuit for interrupting the flow of power to the audio system in response to the activation of the telephone comprising, in combination;

monitor circuit means interposed between the battery and the telephone including first means for creating a first signal in response to a flow of power to the the telephone in excess of a predetermined power threshold and a second signal in response to a flow of power below said threshold; and

circuit interrupter means connected to said monitor circuit means and interposed between the battery and the audio system, said circuit interrupter means including switching means responsive to said first signal for disconnecting the audio system from the battery and responsive to said second signal for connecting the audio system to the battery,

whereby the audio system is disabled whenever the telephone operates and draws power in excess of the predetermined power threshold level.

4,873,713

AUTOMATIC TELEPHONE ANSWERING APPARATUS AND METHOD

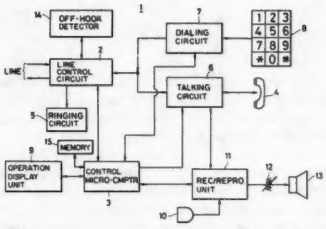
Kiyoshi Yamanouchi, and Sumio Iwase, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Nov. 6, 1987, Ser. No. 118,402

Claims priority, application Japan, Nov. 10, 1986, 61-267304

Int. Cl.[4] H04M *1/64*

U.S. Cl. 379—67 6 Claims



2. A method for automatically answering a telephone and forwarding a notification of a recorded message to a predetermined telephone, comprising the steps of:

recording and automatically reproducing an outgoing message from a subscriber and sending it over a telephone line

to a calling party in response to an incoming call over said telephone line from said calling party;

automatically recording an incoming message from said calling party over a telephone line after the outgoing message is sent;

selectively recording a specific message from the subscriber to be sent to a predetermined telephone set designated by the subscriber, wherein said specific message comprises a relay message for informing that at least one incoming message has been recorded;

electronically receiving from the subscriber a telephone number of the predetermined telephone set and storing said telephone number;

electronically reading out said stored telephone number and automatically dialing said predetermined telephone set a plurality of times within a predetermined period of time upon completion of the recording of the incoming message;

automatically reproducing and sending said specific message over the telephone line to said automatically dialed, predetermined telephone set;

detecting an off-hook state of said predetermined telephone set in response to said automatic dialing and sending said specific message upon detecting the offhook state;

automatically redialing said predetermined telephone a predetermined number of times when a predetermined period of time has elapsed upon completion of a previous automatic dialing and the off-hook state is not detected in response to automatic dialing;

when the off-hook state is detected, performing said specific message sending step and inhibiting said redialing step to prevent subsequent redialing.

4,873,714

SPEECH RECOGNITION SYSTEM WITH AN ACCURATE RECOGNITION FUNCTION

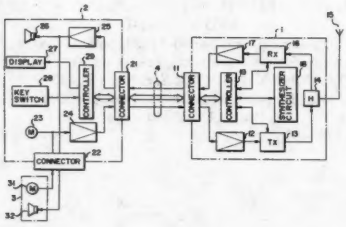
Takaaki Ishii, Sagamihara, and Toru Kuge, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 21, 1986, Ser. No. 933,213

Claims priority, application Japan, Nov. 26, 1985, 60-181654[U]; Nov. 26, 1985, 60-265502; Dec. 20, 1985, 60-287434

Int. Cl.[4] H04M *1/26, 1/56*

U.S. Cl. 379—88 **6 Claims**



1. A speech recognition system with an accurate recognition function, said speech recognition system comprising:

microphone means for producing speech input signals to be registered or recognized of various users;

speech registration/recognition processing means responsive to a speech input signal from the microphone means, wherein said speech registration/recognition processing means is manually selectable so as to subject this speech input signal to either a registration or a recognition processing, in which upon the registration processing the speech input signal is stored as recognition data and upon recognition processing the speech input signal is compared to the recognition data which has been stored;

speech record/reproduction processing means responsive to a speech input signal from the microphone means to subject this speech input signal to a record/reproduction processing, in which upon the record processing this speech input signal is recorded as a record signal and upon the reproduction processing the record signal is delivered as a reproduction signal in a given user voice, which has been pre-registered, in advance;

speaker means to which the reproduction signal is supplied;

mode designation means for delivering a registration or a recognition mode designation signal; and

control means, in accordance with the registration or the recognition mode designation signal, for setting the speech registration/recognition processing means to the registration or the recognition processing mode and for setting the speech record/reproduction processing means to the record or the reproduction processing mode corresponding to the registration or the recognition processing mode in which the speech registration/ recognition processing means is placed.

4,873,715

AUTOMATIC DATA/VOICE SENDING/RECEIVING MODE SWITCHING DEVICE

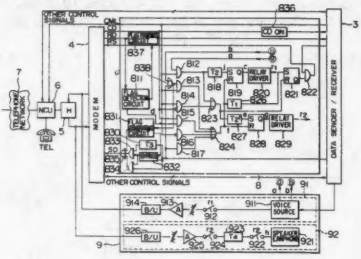
Yoji Shibata, Yokosuka, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 8, 1987, Ser. No. 59,514

Claims priority, application Japan, Jun. 10, 1986, 61-132785

Int. Cl.[4] H04M *11/00*

U.S. Cl. 379—93 **16 Claims**



1. A terminal device which sends/receives data and voice signals through a low speed circuit to/from another device, comprising:

data sending/receiving means which sends/receives digital data;

modulation/demodulation means which modulates/-demodulates digital data from/to said data sending-/receiving means in order to make said digital data conform to said low speed circuit;

voice sending/receiving means which sends/receives voice signals through said low speed circuit; and

voice/data switching means connected between said data sending/receiving means and said modulation/demodulation means for switching between data and voice modes wherein said data mode sends/receives data to/from said other device and said voice mode sends/receives voice to/from said other device;

said voice/data switching means including

detecting means for detecting a received carrier from said other device through said modulation/demodulation means,

means for interrupting said data mode upon detection of an interruption of said received carrier and starting said voice mode, and for connecting said voice sending-/receiving means to said low speed circuit,

detecting means for detecting special data from said other

terminal device through said modulation/demodulation means,

means for outputting a logical product of an output from said special data detecting means and an output from said received carrier detecting means, said logical product output being connected to said modulation/demodulation means, and

means for setting said data mode according to said logical product output from said logical product means and for disconnecting said voice sending/receiving means from said low speed circuit.

4,873,716

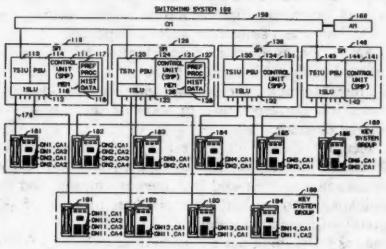
PATH ALLOCATION ARRANGEMENT FOR MULTI-TERMINAL GROUPS

Patrick K. Brady, Wheaton, Ill., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 27, 1988, Ser. No. 290,608

Int. Cl.[4] H04M *3/02*

U.S. Cl. 379—134 **25 Claims**



1. In a switching system connectable to a plurality of terminals, a method of processing calls to a directory number shared by a multiple number of said terminals, said method comprising the following steps:

selecting, based on call answering activity, a preferred terminal of said multiple terminals to serve a subsequent call to said directory number;

before receiving an answer request from any of said multiple terminals for an incoming call to said directory number, establishing at least a partial connection to said preferred terminal, said connection for use in answering said incoming call at said preferred terminal; and

enabling other of said multiple terminals to answer said incoming call.

4,873,717

CALL COVERAGE ARRANGEMENT

Wayne A. Davidson, Winfield; John P. Ernst, Warrenville; Marybeth Herkes, Aurora; Ram Kuppuswami, Wheaton; Timothy A. Satalich, Warrenville, and John J. Stanaway, Jr., Wheaton, all of Ill., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

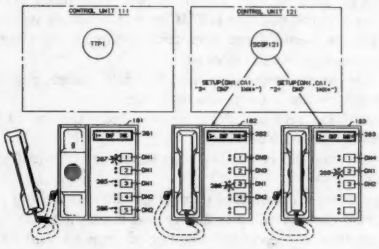
Filed Jun. 14, 1988, Ser. No. 206,467

Int. Cl.[4] H04M *3/42*

U.S. Cl. 379—157 **30 Claims**

1. In an arrangement comprising a switching system interconnecting a plurality of terminals, a method for providing call coverage for calls to a directory number shared by a first one of said terminals and a second one of said terminals, said first terminal including a two-part indicator comprising a first part for identifying any one of said terminals and a second part for defining switch-hook status of at most one of said terminals said first terminal also including a first plurality of call appearances with at least one of said first plurality of call appearances assigned said directory number, said second terminal including a second plurality of call appearances, said method comprising

in response to an incoming call for said directory number, determining switch-hook status of said second terminal,



transmitting said determined switch-hook status to said first terminal,

in response to receipt of said determined switch-hook status, said first terminal using said two-part indicator to provide an indication for use in answering said call at said first terminal such that said first part identifies said second terminal and said second part defines said determined switch-hook status of said second terminal as identified by said first part, and

while performing said step of using said two-part indicator, alerting at said at least one cell appearance at said first terminal in response to said call for said directory number.

4,873,718

FEATURE TELEPHONE INTEGRATION DEVICE

Paul M. Barnett, Sunnyvale; Douglas A. Welch, San Jose, and Duncan J. MacMillan, Jr., Los Altos, all of Calif., assignors to Octel Communications Corp., Milpitas, Calif.

Continuation of Ser. No. 74,532, Jul. 16, 1987, abandoned. This application Nov. 22, 1988, Ser. No. 275,659

Int. Cl.[4] H04M *1/64, 11/00*

U.S. Cl. 379—156 **6 Claims**

1. Feature telephone integration apparatus comprising

a feature telephone set,

an applications processor,

a PBX,

integration means for monitoring telephone communcations between said applications processor, said feature telephone set and said PBX in order to determine the nature or type of said telephone communications, and

means for informing said applications processor of the nature or type of said telephone communications.

4,873,719

ENHANCED CALLING NUMBER DELIVERY SERVICE SYSTEM

Morris Reese, 693 Azalea St., Thousand Oaks, Calif. 91360

Filed Nov. 18, 1988, Ser. No. 272,829
Int. Cl.[4] H04M *3/58*
U.S. Cl. 379—215 **2 Claims**

1. A method of controlling central office equipment which allows an incoming caller directory or keyed-in telephone number or name, or a faxed document to be transmitted in DTMF signals form over a called customer busy, idle or in-use line while said called customer may or may not be engaged in an existing ongoing telephone conversation with another caller, and an apparatus for receiving said transmitted DTMF signals and converting said DTMF signals to analog signals to be stored to memory for later recall, display, redialing or printing, comprising the steps of:

(a) detecting, determining whether said called customer telephone line is busy, idle or in-use;

(b) verifying said called customer subscription to calling number delivery service;

(c) verifying said called customer subscription to call-waiting;

(d) counting a preselected number of said call-waiting tone signals on said called customer said in-use line;

(e) counting a preselected number of rings on said called customer said idle line;

(f) cancelling said rings to said incoming caller after said preselected number of said call-waiting tone signals on said called customer said in-use line have expired;

(g) cancelling said rings to said called customer and to said incoming caller after said preselected number of said rings on said called customer said idle line have expired;

(h) enabling, connecting a prerecorded announcement to said incoming caller immediately after said detecting a busy condition on said called customer said busy line;

(i) enabling, connecting said prerecorded announcement to said incoming caller immediately after said cancelling of said rings to said incoming caller;

(j) responding to said prerecorded announcement by permitting said incoming caller or operator to either press the * code key plus any keyed-in telephone number or name on the touchtone telephone which receives keyed digits to central office multifrequency receiver memory, or permit said incoming caller to press the #code key on said touchtone telephone which automatically transmits said telephone number of said incoming caller from the originating office stored program controlled system memory to which said incoming caller is connected, to the terminating office stored program controlled system memory to which said called customer is connected, or permit said incoming caller to terminate the call by hanging up;

(k) converting said directory telephone number in said terminating office said stored program controlled system memory from digital signals to analog signals to DTMF signals;

(l) enabling and connecting central office multifrequency sender switch to said called customer said busy, idle or in-use voice channel and transmit either said keyed digits from said multifrequency receiver memory or said DTMF signals from said terminating office said stored program controlled system memory to said called customer premises equipment;

(m) receiving, displaying and storing to said premises equipment said keyed digits or said DTMF signals which are converted to analog signals for later recall and or redialing; and

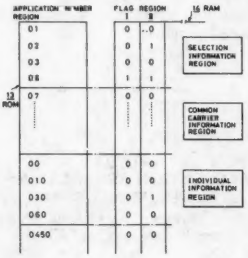
(n) terminating said calling number delivery service process after receipt of said keyed digits or said DTMF signals to said premises equipment.

4,873,720

AUTOMATIC DIALER

Masayoshi Son, Tokyo, Japan, assignor to Datanet Corp., Tokyo, Japan

Filed Mar. 23, 1988, Ser. No. 172,241
Int. Cl.[4] H03M *1/27*
U.S. Cl. 379—356 **2 Claims**



1. An automatic dialer for sending a calling signal from a calling subscriber telephone to a called subscriber telephone via a telephone switchboard and one of a plurality of common carriers, said automatic dialer coupled to said calling subscriber telephone, said automatic dialer comprising:

first memory means for storing dialed information provided from said calling subscriber telephone;

second memory means for storing predetermined additional information corresponding to each of the plurality of common carriers;

third memory means for storing specific discriminating information corresponding to a portion of said dialed information stored in said first memory means, said discriminating information corresponding to ones of said plurality of common carriers;

read means for reading out a portion of said dialed information from said first memory means;

access means for reading out said specific discriminating information stored in said third memory means, in response to the portion of said dialed information read by said read means;

transmitting means for transmitting said predetermined additional information stored in said second memory means together with said dialed information stored in said first memory means to said telephone switchboard when said specific discriminating information stored in said third memory means is accessed; and

writing means for controlling a writing operation of said third memory means on the basis of a tone signal provided from an external system via a telephone switchboard assigned to a common carrier.

4,873,721

DEVICE FOR STARTING CHARGING IN A PAY PHONE

Claude Barraud, Paris, France, assignor to Schlumberger Industries, Montrouge, France

Filed Nov. 17, 1987, Ser. No. 235,661
Claims priority, application France, Nov. 18, 1986, 16 0000
Int. Cl.[4] H04K *1/00*
U.S. Cl. 380—9 **8 Claims**

1. A device for starting telephone charging in a pay phone, the device being characterized in that it comprises:

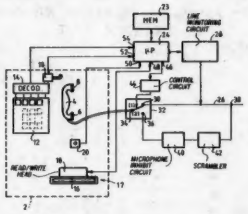
prevention means (40, 40') for preventing the microphone of the handset of said pay phone from operating;

first control means (32, 44) for inhibiting said prevention means;

scrambler means (42) for allowing only the signal corresponding to ringing tone to reach the earpiece of the

handset and for scrambling the signal corresponding to the human voice;

second control means (32, 44) for inhibiting said filter means (42); and



user-operable means (20) operatable by the user of said pay phone, with operation of said means serving firstly to actuate said first and second control means to inhibit said prevention means and said filter means, and secondly causing telephone charging to begin.

4,873,722

MULTI-CHANNEL REPRODUCING SYSTEM

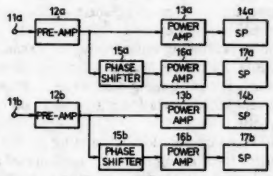
Noboru Tominari, Tokyo, Japan, assignor to Dynavector, Inc., Tokyo, Japan

Continuation of Ser. No. 867,234, May 23, 1986, abandoned. This application Oct. 15, 1987, Ser. No. 111,075

Claims priority, application Japan, Jun. 7, 1985, 60-123630

Int. Cl.[4] H04S 5/00

U.S. Cl. 381—17 **2 Claims**



1. A multi-channel reproducing system for reproducing a sound with presence so that a listener can listen to the reproduced sound with a feeling as if he is listening to the sound in a concert hall, by simulating the effect of dispersion caused in the spectrum of an indirect sound which is produced in the concert hall by reflections of the sound at inner walls of the concert hall, comprising:

right and left main speaker means for respectively sounding right and left input audio signals as right and left main channel audio signals;

right and left phase shifter means respectively supplied with said right and left input audio signals for, by shifting phases thereof, generating respective right and left output signals; and

right and left sub-speaker means respectively supplied with said right and left output signals from said right and left phase shifter means as right and left sub-channel audio signals for sounding said right and left sub-channel audio signals;

said right and left main speaker means and said right and left sub-speaker means are disposed in such a relation to each other that general direction of sounds generated from said right and left main speaker means respectively oppose general directions of sound generated from said right and left sub-speaker means, each of said phase shifter means having a frequency versus phase delay characteristic in which an amount of phase delay increases steeply with frequency in a low frequency range and gradually approaches a very arge constant larger than three thousand degrees in a higher frequency range and said phase shifter means has a corresponding frequency versus delay time characteristic in which the delay becomes larger than 100 msec as the frequency decreases below 50 Hz and becomes smaller as the frequency increases,

each of said right and left phase shifter means comprises a plurality of mutually cascaded phase shifting circuits respectively having an identical circuit constructions and cascaded in about seventeen stages or more to produce an overall phase delay of over three thousand degrees, each of the phase shifting circuits comprises an operational amplifier, a resistor R_1 connected between an input terminal of said phase shifting circuit and an inverting input terminal of said operational amplifier, a resistor R_2 connected between an output side of said operational amplifier and said inverting input terminal, a resistor R_p connected between said input terminal and a non-inverting input terminal of said operational amplifier and a capacitor C_p connected between the non-inverting input terminal of said operational amplifier and ground, and the phase shifting circuit has a characteristic of a transfer function $G_1(s)$ represented by

$$G_1(s) = \left(\frac{1 - \tau_1 \cdot s}{1 + \tau_1 \cdot s} \right)$$

where τ_1 is a time constant defined as $\tau_1 = R_p \cdot C_p$, and s is a Laplace's operator, and

each of said plurality of phase shifting circuits respectively have identical circuit constants, and each of said right and left phase shifter means has a characteristic of a transfer function G(s) described by

$$G(s) = \left(\frac{1 - \tau_1 \cdot s}{1 + \tau_1 \cdot s} \right)^n .$$

4,873,723

METHOD AND APPARATUS FOR MULTI-PULSE SPEECH CODING

Kouichi Shibagaki, and Akira Fukui, both of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Sep. 16, 1987, Ser. No. 97,524

Claims priority, application Japan, Sep. 18, 1986, 61-221307

Int. Cl.[4] G10L 3/02

U.S. Cl. 381—34 **12 Claims**

2. A multi-pulse speech coder comprising:

a pitch extracting means for extracting a pitch period from an input speech signal;

a linear predictive coding analyzig means responsive to said extracting means for determing coefficients of a synthetic filter by applying linear predictive coding analysis to the input speech signal;

a first impulse response calculating means jointly responsive to said extracting means and said analyzing means for calculating an impulse response of a synthetic filter with pitch prediction based on the pitch period as extracted by said pitch extracting means and the coefficients as determined by said linear predictive coding analyzing means;

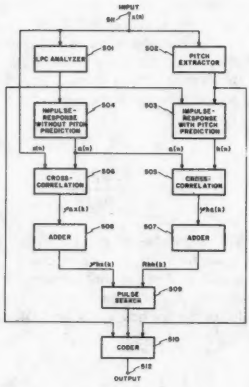
a second impulse response calculating means responsive to said analyzing means for calculating an impulse response of a synthetic filter without pitch prediction based on the coefficients as determined by said linear predictive coding analyzing means;

a first crosscorrelation calculating means jointly responsive to said input speech signal and said second impulse response calculating means for calculating crosscorrelations

between the impulse response of said synthetic filter with pitch prediction output by said first impulse response calculating means and the impulse response of said synthetic filter without pitch prediction output by said second impulse response calculating means;

a first adding means responsive to said first crosscorrelation calculating means for adding the crosscorrelations as calculated by said first crosscorrelation calculating means to produce autocorrelations of the impulse response of said synthetic filter with pitch prediction;

a second crosscorrelation calculating means jointly responsive to said second impulse response calculating means and the input speech signal for calculating crosscorrelations between the impulse response of said synthetic filter



without pitch prediction output by said second impulse response calculating means and the input speech signal;

a second adding means jointly responsive to said second crosscorrelation calculating means and the input signal for adding the crosscorrelations as calculated by said second crosscorrelation calculating means to produce crosscorrelations between the impulse response of said synthetic filter with pitch prediction and the input speech signal; and

a pulse search means jointly responsive to said first and second adding means for searching for a plurality of pulses for exciting a synthetic filter based on the autocorrelations output by said first adding means and the crosscorrelations output by said second adding means.

4,873,724

MULTI-PULSE ENCODER INCLUDING AN INVERSE FILTER

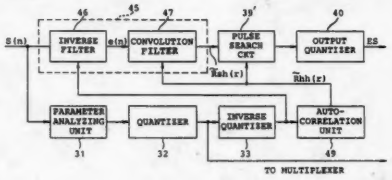
Yayoi Satoh, and Toshihiko Mizukami, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Jul. 16, 1987, Ser. No. 74,193

Claims priority, application Japan, Jul. 17, 1986, 61-168901

Int. Cl.[4] G10L *5/00*

U.S. Cl. 381—40 **6 Claims**



1. An encoder for use in encoding a speech signal, given through a vocal tract, into a plurality of excitation pulses, each pulse having an amplitude and a location determined by said speech signal, said encoder comprising:

parameter caculating means, responsive to said speech signal, for calculating a parameter specific to said speech signal and for producing a parameter signal representative of said parameter;

autocorrelation calculating means, responsive to said parameter signal, for calculating an autocorrelation related to said speech signal and for producing an autocorrelation signal representative of said autocorrelation;

cross-correlation calculating means, coupled to said autocorrelation calculating means and responsive to said speech signal, for calculating a cross-correlation related to said parameter and said speech signal

and for producing a cross-correlation signal representative of said cross-correlation; and

excitation pulse producing means, coupled to said autocorrelation calculating means and said cross-correlation calculating means, for producing said excitation pulses in response to said autocorrelation signal and said cross-correlation signal;

wherein said cross-correlation calculating means comprises:

an inverse filter responding to said speech signal and having an inverse filter characteristic relative to said vocal tract, said inverse filter producing a residual signal representative of a residue resulting from passage of said speech signal through said inverse filter;

filtering means, coupled to said inverse filter and said autocorrelation calculating means, for filtering said residual signal and for producing a filtered signal, said filtering means having an impulse response determined by said autocorrelation signal; and

signal supplying means for supplying said filtered signal to said excitation pulse producing means as said cross-correlation signal.

303,865

COOKIE HAVING OPENINGS THERETHROUGH

Michael P. Lucas, Ridgewood, N.J.; Robert Tabor, New York, N.Y.; Richard B. Gerstman, Tenafly, N.J., and Juan F. Concepcion, Brooklyn, N.Y., assignors to Nabisco Brands, Inc., Parsippany, N.J.

Division of Ser. No. 731,488, May 7, 1985, Pat. No. Des. 297,280. This application May 10, 1988, Ser. No. 192,123

Term of patent 14 years

U.S. Cl. D1—109

303,866

COOKIE HAVING OPENINGS THERETHROUGH

Michael P. Lucas, Ridgewood, N.J.; Robert Tabor, New York, N.Y.; Richard B. Gerstman, Tenafly, N.J., and Juan F. Concepcion, Brooklyn, N.Y., assignors to Nabisco Brands, Inc., Parsippany, N.J.

Division of Ser. No. 731,488, May 7, 1985, Pat. No. Des. 297,280. This application May 10, 1988, Ser. No. 192,124

Term of patent 14 years

U.S. Cl. D1—109

303,867

HIGH TOP MOCCASIN TOE WALKER

James Argyropoulos, Venice, Calif., assignor to The Cherokee Group, Sunland, Calif.

Filed Mar. 26, 1987, Ser. No. 30,547

Term of patent 14 years

U.S. Cl. D2—268

303,868

LOW TOP MOCCASIN TOE WALKER

James Argyropoulos, Venice, Calif., assignor to The Cherokee Group, Sunland, Calif.

Filed Mar. 26, 1987, Ser. No. 34,561

Term of patent 14 years

U.S. Cl. D2—268

303,869

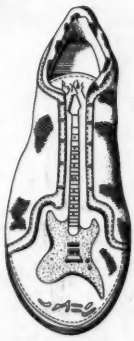
SPORTS SHOE

Rexy Jacobs, 1182b Market, #632, San Francisco, Calif. 94102

Filed Oct. 3, 1986, Ser. No. 916,037

Term of patent 14 years

U.S. Cl. D2—310

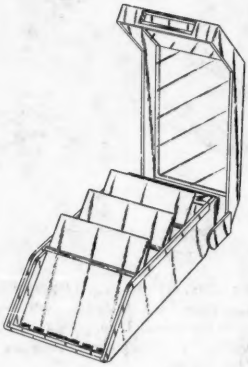


303,870
SHOE UPPER
Lawrence Selbiger, Portland, Oreg., assignor to Avia Group International, Inc., Portland, Oreg.
Filed Feb. 2, 1989, Ser. No. 305,206
Term of patent 14 years
U.S. Cl. D2—314

303,871
SOLE
Dennis Driscoll, Healdsburg, Calif., assignor to Asahi Corporation, Tokyo, Japan
Filed Feb. 27, 1987, Ser. No. 19,608
Claims priority, application Japan, Sep. 27, 1986, 61-38347
Term of patent 14 years
U.S. Cl. D2—320

303,872
COMBINED SCISSORS WITH CAP
Hiromi Tamamura, Tokyo, Japan, assignor to Plus Corporation, Japan
Filed Feb. 10, 1986, Ser. No. 827,416
Term of patent 14 years
U.S. Cl. D3—18

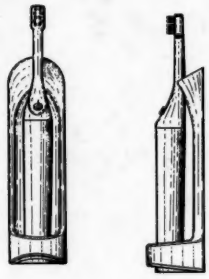
303,873
DISKETTE STORAGE CONTAINER
Bernd Brüssing, Neu-Ulm, Fed. Rep. of Germany, assignor to Hans Friedrich Hefendehl, Kierspe, Fed. Rep. of Germany
Filed Apr. 24, 1986, Ser. No. 857,616
Claims priority, application Fed. Rep. of Germany, Oct. 24, 1985, MR 627
Term of patent 14 years
U.S. Cl. D3—35



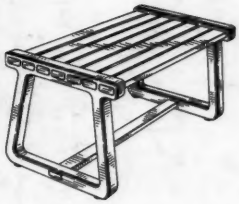
303,874
COSMETIC CASE OR SIMILAR ARTICLE
Lai Wei-Mu, No. 31-1, Sec. 1, Wan Ho Road, Nan Tun District, Taichung, Taiwan
Filed Jun. 10, 1986, Ser. No. 872,756
Term of patent 14 years
U.S. Cl. D3—39

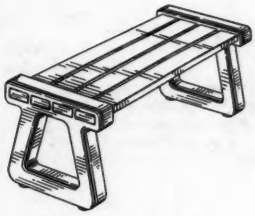
303,875
HOLSTER
Ernest H. Hill, 3128 S. Extension, Mesa, Ariz. 85202
Filed Apr. 16, 1986, Ser. No. 852,934
Term of patent 14 years
U.S. Cl. D3—101

303,876
COMBINED ELECTRIC PERIODONTAL BRUSH AND MOUNTING BRACKET
George S. Clemens, Northfield, Ill., and Spencer L. Mackay, Agoura Hills, Calif., assignors to Dental Research Corporation, Tucker, Ga.
Filed Feb. 6, 1986, Ser. No. 827,275
Term of patent 14 years
U.S. Cl. D4—101

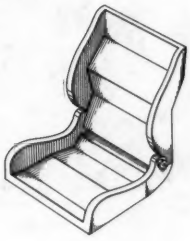


303,877
BENCH
Ian F. Norton, Toronto, Canada, assignor to Union Carbide Canada Limited, Toronto, Canada
Filed May 8, 1986, Ser. No. 862,392
Claims priority, application Canada, Mar. 14, 1986, 14-03-86-5
Term of patent 14 years
U.S. Cl. D6—349

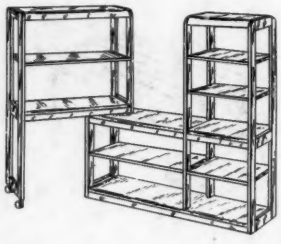




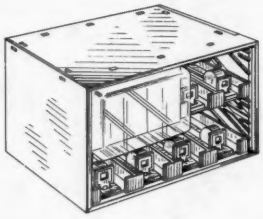
303,878
FOLDABLE SEAT FOR USE PRIMARILY IN A BOAT
Howard G. Goldsmith, Cranston, R.I., assignor to Todd Enterprises, Inc., Cranston, R.I.
Filed Oct. 21, 1986, Ser. No. 921,635
Term of patent 14 years
U.S. Cl. D6—368

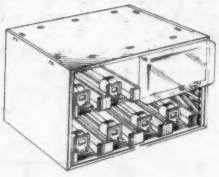


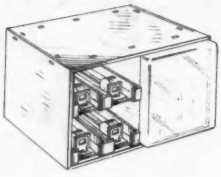
303,879
SWIVEL DESK AND DISPLAY UNIT
David P. G. Williams, Englewood, N.J., assignor to Mohasco Upholstered Furniture Corporation, Fairfax, Va.
Filed May 1, 1987, Ser. No. 44,572
Term of patent 14 years
U.S. Cl. D6—397



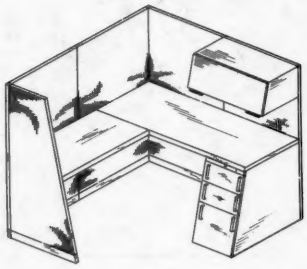
303,880
COMBINED DISPLAY AND DISPENSER RACK
Fred W. Kates, New York, and Karl Yeranossian, Pearl River, both of N.Y., assignors to Revlon, Inc., New York, N.Y.
Division of Ser. No. 847,596, Mar. 31, 1986, Pat. No. Des. 299,597. This application Nov. 9, 1988, Ser. No. 269,947
Term of patent 14 years
U.S. Cl. D6—408



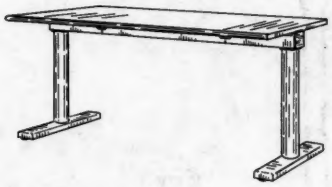


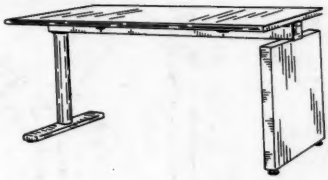


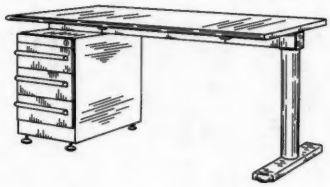
303,881
MODULAR OFFICE WORK STATION
Isidoro N. Markus, 65-36 99th St. (1E), Rego Park, N.Y. 11374
Filed May 30, 1986, Ser. No. 869,118
Term of patent 14 years
U.S. Cl. D6—421



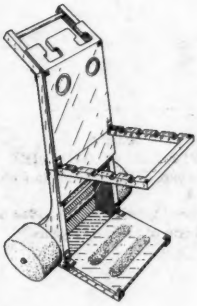
303,882
DESK
Ettore Sottsas, and Michele DeLucchi, both of Milan, Italy, assignors to Olivetti Synthesis, S.p.A., Ivrea, Italy
Division of Ser. No. 845,001, Mar. 18, 1986, Pat. No. Des. 299,798. This application Jul. 27, 1988, Ser. No. 225,726
Claims priority, application Italy, Sep. 18, 1985, 53806/85[U]
Term of patent 14 years
U.S. Cl. D6—422

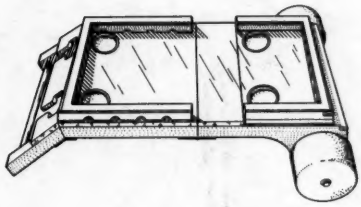




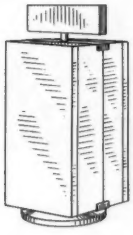


303,883
FOLDABLE BEACH EQUIPMENT CARRIER
Donnie W. Higson, 505 Queen Anne's Rd., Greenville, N.C. 27834, and Michael E. Higson, 108 Eighth Ave., North Myrtle Beach, S.C. 29582
Filed Oct. 6, 1986, Ser. No. 916,095
The portion of the term of this patent subsequent to Aug. 29, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—429





303,884
DISPLAY STAND
Karl Yeranossian, Pearl River, N.Y., assignor to Revlon, Inc., New York, N.Y.
Division of Ser. No. 538,408, Oct. 3, 1983, Pat. No. Des. 286,829. This application Jul. 21, 1986, Ser. No. 887,401
Term of patent 14 years
U.S. Cl. D6—455



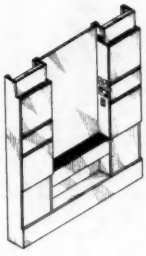
303,885
TABLE
Charles R. Goetz, Carnegie, Pa., assignor to Alco Industries, Inc., Valley Forge, Pa.
Filed Sep. 3, 1986, Ser. No. 903,439
Term of patent 14 years
U.S. Cl. D6—484

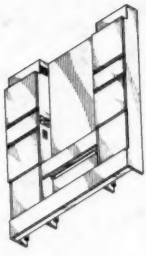
303,886
TABLE LEG OR THE LIKE
Mary J. Reid, Sheboygan, Wis., assignor to Kohler Co., Kohler, Wis.
Filed Dec. 22, 1986, Ser. No. 944,619
Term of patent 14 years
U.S. Cl. D6—499

303,887
TABLE LEG OR THE LIKE
Mary J. Reid, Sheboygan, Wis., assignor to Kohler Co., Kohler, Wis.
Filed Jan. 12, 1987, Ser. No. 2,251
Term of patent 14 years
U.S. Cl. D6—499

303,888
SEAT
John R. Stafford, Greensboro, N.C., assignor to Chromcraft Furniture Corporation, Senatobia, Miss.
Filed Jun. 10, 1988, Ser. No. 205,107
Term of patent 14 years
U.S. Cl. D6—502

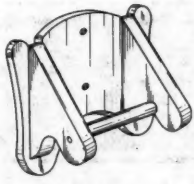
303,889
HEADWALL UNIT FOR HOSPITAL ROOMS
Ira M. Durham, Jr., Houston, Tex., assignor to The Methodist Hospital System, Houston, Tex.
Filed Aug. 7, 1986, Ser. No. 893,966
The portion of the term of this patent subsequent to Apr. 4, 2006, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—505



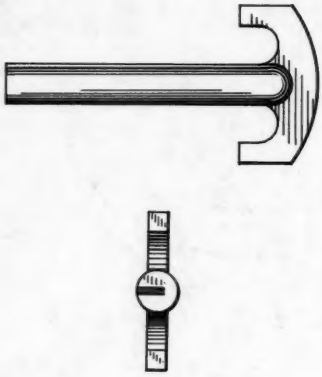


303,890
TOILET PAPER GUARD
Douglas J. Pilot, 28902 Hollow Brook Ave., Agoura Hills, Calif. 91301
Filed Apr. 21, 1986, Ser. No. 856,117
Term of patent 14 years
U.S. Cl. D6—523

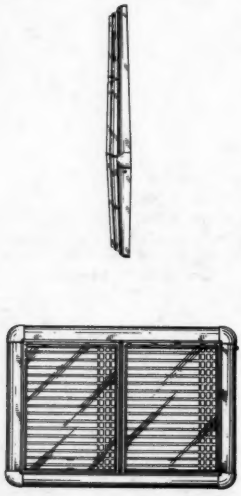
303,891
PAPER ROLL HOLDER
Raymond N. Lee, 9512 Woody La., Great Falls, Va. 22066
Filed Feb. 12, 1987, Ser. No. 13,862
Term of patent 14 years
U.S. Cl. D6—523



303,892
LOCKING TUBE ROLLER
William G. Parker, 1410 Briarwood Dr. R.D. #3, Montoursville, Pa. 17754
Filed Nov. 6, 1987, Ser. No. 117,657
Term of patent 14 years
U.S. Cl. D6—541

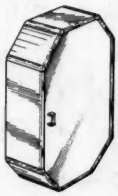


303,893
ILLUMINATED MENU DISPLAY PANEL
John M. Brown, 2600 Lockheed Way, Carson City, Nev. 89701
Filed Mar. 13, 1987, Ser. No. 25,786
Term of patent 14 years
U.S. Cl. D6—559

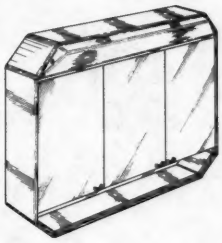


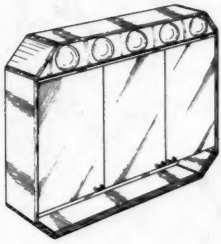
303,894
MIRRORED CABINET
Heinz G. Baus, 35 Wartbodenstrasse, CH-3626 Hünibach-Thun, Switzerland
Filed Aug. 17, 1987, Ser. No. 85,695
Claims priority, application Fed. Rep. of Germany, Feb. 19, 1987, URA198/87
Term of patent 14 years
U.S. Cl. D6—559

303,895
MIRRORED CABINET
Heinz G. Baus, 35 Wartbodenstrasse, CH-3626 Hünibach-Thun, Switzerland
Filed Aug. 26, 1987, Ser. No. 89,622
Claims priority, application Hague, Aug. 6, 1987, DM/009072
Term of patent 14 years
U.S. Cl. D6—559



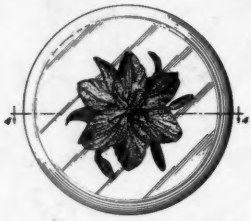
303,896
MIRRORED CABINET
Heinz G. Baus, 35 Wartbodenstrasse, CH-3626 Hünibach-Thun, Switzerland
Filed Aug. 26, 1987, Ser. No. 89,623
Claims priority, application World Int. Prop. O., Aug. 6, 1987, DM/009072
Term of patent 14 years
U.S. Cl. D6—561



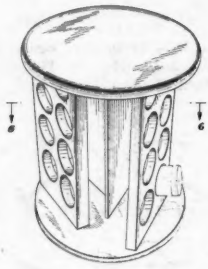


303,897
PILLOW
Katherine A. Phillips, 5780 Mifflin Ave., Pensacola, Fla. 32506
Filed Sep. 2, 1986, Ser. No. 903,092
Term of patent 14 years
U.S. Cl. D6—601

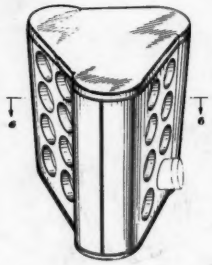
303,898
PLATTER OR SIMILAR ARTICLE
Jean-Jacques Durand, LaBute, 62510, Arques, France
Filed Sep. 25, 1986, Ser. No. 911,201
Term of patent 14 years
U.S. Cl. D7—28



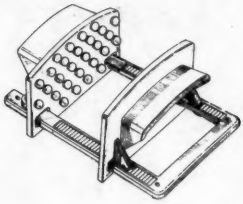
303,899
WOOD SPICE RACK
Jane Ancona, and Bruce Ancona, both of New York, N.Y., assignors to M. Kamenstein, Inc., White Plains, N.Y.
Filed May 16, 1989, Ser. No. 352,455
Term of patent 14 years
U.S. Cl. D7—71



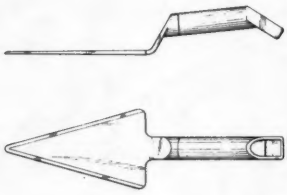
303,900
PLASTIC SPICE RACK
Jane Ancona, and Bruce Ancona, both of New York, N.Y., assignors to M. Kamenstein, Inc., White Plains, N.Y.
Filed May 16, 1989, Ser. No. 355,398
Term of patent 14 years
U.S. Cl. D7—71



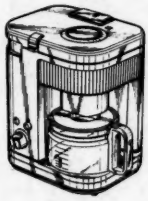
303,901
CLAMP FOR FILLETING FISH
Joseph M. Franey, 7432 Landau Curve, Bloomington, Minn. 55438
Filed Apr. 30, 1987, Ser. No. 44,280
Term of patent 14 years
U.S. Cl. D7—99

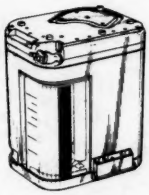


303,902
SERVER FOR CAKES, PIES AND THE LIKE
Bruno Gecchelin, Milan, Italy, assignor to Fratelli Guzzini S.p.A., Recanati, Italy
Filed Nov. 19, 1986, Ser. No. 932,897
Claims priority, application Italy, May 23, 1986, 21970/86[U]
Term of patent 14 years
U.S. Cl. D7—102

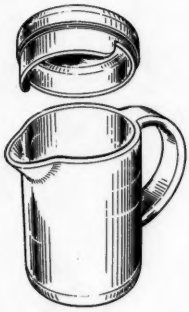


303,903
AUTOMATIC COFFEE MAKER
Ueda Yoshiaki, Osaka, and Mano Kazunori, Hyogo, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Oct. 24, 1986, Ser. No. 923,072
Term of patent 14 years
U.S. Cl. D7—309



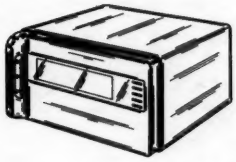


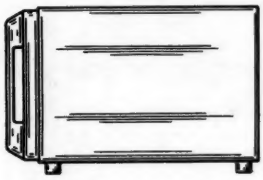
303,904
COVERED JUG
Anthony H. Wolfenden, Victoria, Australia, assignor to The Decor Corporation Proprietary Limited, Scoresby, Australia
Filed Nov. 28, 1986, Ser. No. 936,653
Term of patent 14 years
U.S. Cl. D7—317



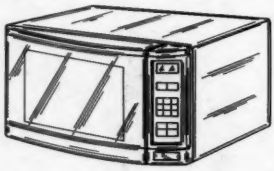
303,905
VACUUM FLASK
José M. P. Gibert, Reus, Spain, assignor to Industria Auxiliar Manodomesticos, S.A., Tarragona, Spain
Filed Dec. 9, 1986, Ser. No. 939,934
Claims priority, application Spain, Jul. 1, 1986, 110.946
Term of patent 14 years
U.S. Cl. D7—317

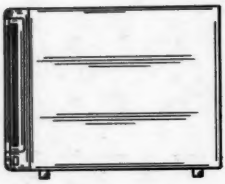
303,906
MICROWAVE OVEN
Hiroshi Nishibori, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Jul. 27, 1987, Ser. No. 78,474
Claims priority, application Japan, Feb. 19, 1987, 62-6393
Term of patent 14 years
U.S. Cl. D7—351



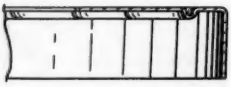


303,907
MICROWAVE OVEN
Wataru Iwahashi, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Dec. 9, 1987, Ser. No. 130,734
Claims priority, application Japan, Jun. 19, 1987, 62-25199
Term of patent 14 years
U.S. Cl. D7—351

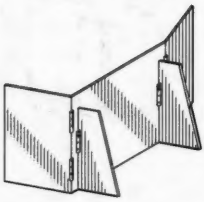




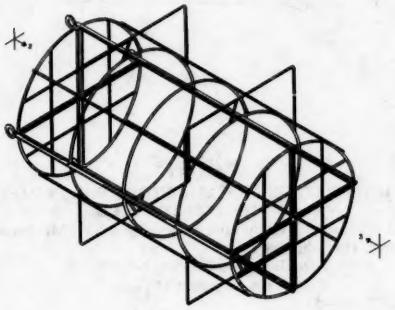
303,908
PIE CRUST SHIELD
Georgette M. Anderson, 2616 NE. 57th Ave., Portland, Oreg. 97213
Filed Oct. 29, 1986, Ser. No. 924,601
Term of patent 14 years
U.S. Cl. D7—387

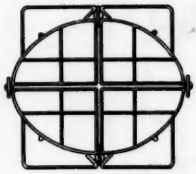


303,909
STOVETOP GREASE SPATTER SHIELD
Genevieve K. Stankus, 4126-104 Ave. N.; Robert Stankus, 4176 104th Ave. N., both of Clearwater, Fla. 33520, and Gerald Stankus, 13232 Winsford La., Fort Myers, Fla. 33907
Filed May 11, 1987, Ser. No. 47,994
Term of patent 14 years
U.S. Cl. D7—406

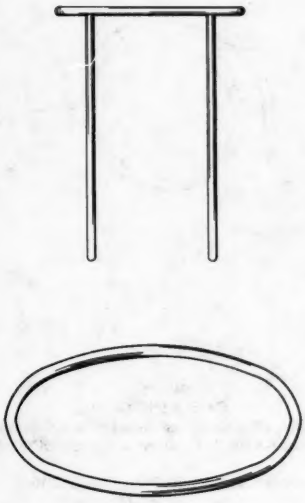


303,910
ROASTING BASKET
Robert J. Sjoberg, 6212 Bion Ave., San Gabriel, Calif. 91775
Filed Apr. 22, 1986, Ser. No. 857,567
Term of patent 14 years
U.S. Cl. D7—409

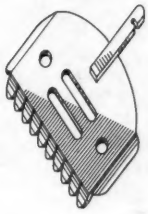




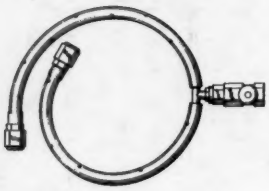
303,911
PLANT SUPPORT
Vivian L. Saari, 1 Binninger Rd. Ext., Shushaw, N.Y. 12873
Filed Aug. 10, 1987, Ser. No. 83,299
Term of patent 14 years
U.S. Cl. D8—1



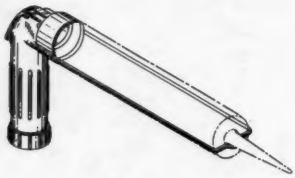
303,912
HAND HELD TOOL FOR PACKING AND LOADING OF LEAVES
Mark R. Butler, 4321 Kenston Way, Sacramento, Calif. 95822
Filed Oct. 8, 1987, Ser. No. 106,315
Term of patent 14 years
U.S. Cl. D8—1



303,913
TREE SOAKER
Earl J. Leap, Rte. 1, Box 232, Oak Grove, Mo. 64075
Filed Oct. 19, 1987, Ser. No. 110,530
Term of patent 14 years
U.S. Cl. D8—1



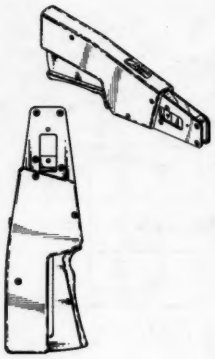
303,914
CAULKING GUN
Milton Hinden, Glen Head, and John Lyons, Levittown, both of N.Y., assignors to Duro-Dyne Corporation, Farmingdale, N.Y.
Filed Aug. 17, 1987, Ser. No. 86,040
Term of patent 14 years
U.S. Cl. D8—14.1



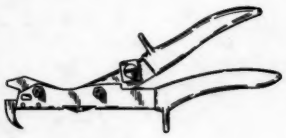
303,915
BEVERAGE CAN OPENING RING
Kevin M. Knutson, 3486 E. 8505 S., Salt Lake City, Utah 84121
Filed Mar. 11, 1986, Ser. No. 844,272
Term of patent 14 years
U.S. Cl. D8—18

303,916
DOUBLE-ENDED BOX WRENCH
Davis S. Colvin, 23933 Haynes, Farmington Hills, Mich. 48018, assignor to Davis S. Colvin, Farmington Hills, Mich.
Filed Mar. 24, 1987, Ser. No. 29,596
Term of patent 14 years
U.S. Cl. D8—22

303,917
MULTIPLE STROKE RATCHET TOOL FOR CRIMPING, CUTTING OR THE LIKE
John G. Hatfield, Camp Hill, Pa., assignor to AMP Incorporated, Harrisburg, Pa.
Filed Jun. 11, 1986, Ser. No. 873,036
Term of patent 14 years
U.S. Cl. D8—51

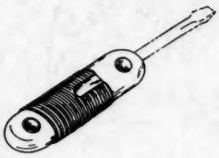


303,918
COMBINED RADIATOR TAB LIFTER AND CRIMPER
Alan E. Gickler, Clinton, Iowa, assignor to Johnson Manufacturing Company, Princeton, Iowa
Filed Jan. 12, 1987, Ser. No. 2,556
Term of patent 14 years
U.S. Cl. D8—52



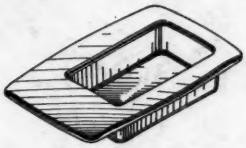
303,919
COMBINED HAIRSTYLING SCISSORS-COMB
Louis Pate, Oak Grove, Ky. 42262
Filed Mar. 25, 1986, Ser. No. 845,830
Term of patent 14 years
U.S. Cl. D8—57

303,920
HANDLE FOR A SCREWDRIVER
Frederick S. Kandel, Columbia, Md., assignor to Majestic Tool Corp., Baltimore, Md.
Filed Sep. 14, 1987, Ser. No. 95,940
Term of patent 14 years
U.S. Cl. D8—83

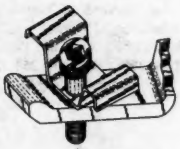


303,921
UTILITY KNIFE OR SIMILAR ARTICLE
Alfred Blochlinger; Christopher Collins, both of South Yarra; Cvetan Petroff, Northcote, and Wallace Tench, South Yarra, all of Australia, assignors to McPherson's Limited, Australia
Filed May 12, 1986, Ser. No. 862,534
Claims priority, application Australia, Nov. 11, 1985, 3205/85
Term of patent 14 years
U.S. Cl. D8—98

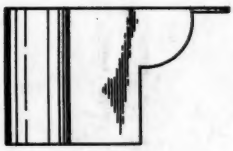
303,922
HOUSINGS FOR LATCHES OR LOCKS
Richard H. Russell, Farmington; David W. Kaiser, North Haven, and Richard M. O'Grady, Southington, all of Conn., assignors to The Eastern Company, Cleveland, Ohio
Filed Jul. 10, 1987, Ser. No. 72,282
Term of patent 14 years
U.S. Cl. D8—321



303,923
GRID CLAMP FOR SUPPORT BEAM OR THE LIKE
Neil F. Gill, and Gordon H. Alderton, both of Bradford, United Kingdom, assignors to Lindapter International Limited, West Yorkshire, Great Britain
Filed Dec. 24, 1986, Ser. No. 946,295
Term of patent 14 years
U.S. Cl. D8—394



303,924
CORNER PROTECTOR
Otto G. Klein, 10703 College, Kansas City, Mo. 64137
Filed May 19, 1987, Ser. No. 51,302
Term of patent 14 years
U.S. Cl. D8—403

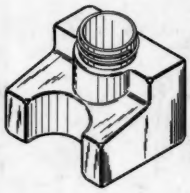


303,925
COMBINED PACKAGE AND DISPENSER FOR EXTRUDIBLE COMESTIBLES
George Mileos, Riverdale, N.Y., assignor to General Foods Corp., White Plains, N.Y.
Filed Sep. 2, 1986, Ser. No. 903,061
Term of patent 14 years
U.S. Cl. D9—306

303,926
INK DISPENSING BOTTLE
Clarence J. Venne, and Richard A. Venne, both of Bensalem, Pa., assignors to Clarence J. Venne, Inc., Bensalem, Pa.
Division of Ser. No. 767,576, Aug. 20, 1985. This application Oct. 3, 1988, Ser. No. 254,530
Term of patent 14 years
U.S. Cl. D9—349

303,927
CONTAINER WITH CAP
Heinz Weber, Apt. 712, 21 Lakeshore Rd., Pointe Claire, Quebec, Canada
Filed Jun. 24, 1986, Ser. No. 877,979
Term of patent 14 years
U.S. Cl. D9—371

303,928
BOTTLE
Juris M. Mednis, Howell, N.J., assignor to Universal Symetrics Corporation, Howell, N.J.
Filed Apr. 3, 1986, Ser. No. 847,837
Term of patent 14 years
U.S. Cl. D9—375

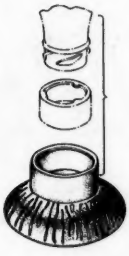


303,929
BOTTLE
Samuel Ross, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio
Filed Mar. 31, 1986, Ser. No. 847,591
Term of patent 14 years
U.S. Cl. D9—376

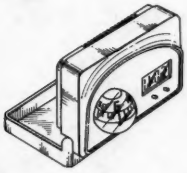
303,930
PERFUME BOTTLE
Jean-Jacques Durand, LaBute, 62510 Arques, France
Filed Jun. 17, 1986, Ser. No. 875,742
Term of patent 14 years
U.S. Cl. D9—403

303,931
BOOK BLISTER PACKAGE
Ruth E. Miller, and Jack V. Miller, both of 700 N. Auburn Ave., Sierra Madre, Calif. 91024
Filed Apr. 27, 1987, Ser. No. 81,036
Term of patent 14 years
U.S. Cl. D9—415

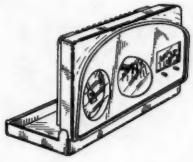
303,932
CHEF'S HAT BOTTLE CAP
Norbert Pasillas, 7251 Comstock Ave. #F, Whittier, Calif. 90605
Filed May 13, 1986, Ser. No. 862,895
Term of patent 14 years
U.S. Cl. D9—451



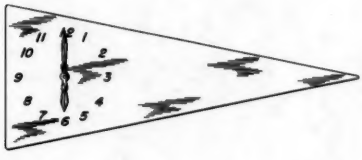
303,933
COMBINED DIGITAL CLOCK AND COMPASS FOR VEHICLES
Marc R. Iacovelli, Miami, Fla., assignor to Rally Manufacturing, Inc., Miami, Fla.
Filed Dec. 5, 1986, Ser. No. 938,748
Term of patent 14 years
U.S. Cl. D10—2



303,934
COMBINED DIGITAL CLOCK, THERMOMETER AND COMPASS FOR VEHICLES
Marc R. Iacovelli, Miami, Fla., assignor to Rally Manufacturing, Inc., Miami, Fla.
Filed Dec. 5, 1986, Ser. No. 938,749
Term of patent 14 years
U.S. Cl. D10—2



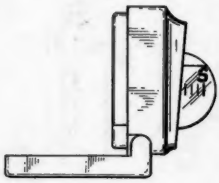
303,935
PENNANT CLOCK
Ronald Coleman, 2700 W. Milbrook Ct., Peoria, Ill. 61615
Filed Apr. 30, 1986, Ser. No. 858,283
Term of patent 14 years
U.S. Cl. D10—6



303,936
WRISTWATCH
Jacqueline Debiue, Gland, Switzerland, assignor to Leonard S.A., Switzerland
Filed Dec. 30, 1986, Ser. No. 947,970
Claims priority, application Switzerland, Jul. 8, 1986, 115356
Term of patent 14 years
U.S. Cl. D10—32

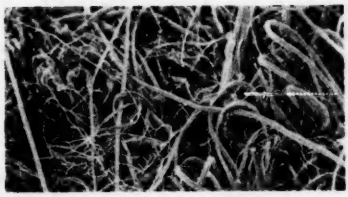
303,937
WATCH WITH NEON-LIKE ILLUMINATION RING
M. Frazier King, Jr., 220 Luther Dr., and Elizabeth A. Ciarfeo, 1045 Shook, Apartment 131, both of San Antonio, Tex. 78212
Filed May 16, 1986, Ser. No. 864,123
Term of patent 14 years
U.S. Cl. D10—39

303,938
COMBINED THERMOMETER AND COMPASS FOR VEHICLES
Marc R. Iacovelli, Miami, Fla., assignor to Rally Manufacturing, Inc., Miami, Fla.
Filed Dec. 5, 1986, Ser. No. 938,747
Term of patent 14 years
U.S. Cl. D10—53



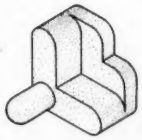
303,939
COMPASS HOLDER
Toshikazu Yusa, Tokyo, Japan, assignor to Tokyo Compass Mfg. Co., Ltd., Tokyo, Japan
Filed Sep. 24, 1986, Ser. No. 911,311
Claims priority, application Japan, Aug. 4, 1986, 61-26602
Term of patent 14 years
U.S. Cl. D10—74

303,940
LINK CHAIN FOR BRACELET OR THE LIKE
Alain-Dominique Perrin, Rueil-Malmaison, France, assignor to Cartier International B.V., Amsterdam, Netherlands
Filed Oct. 16, 1987, Ser. No. 109,027
Claims priority, application France, Apr. 17, 1987, 87 2309
Term of patent 14 years
U.S. Cl. D11—13

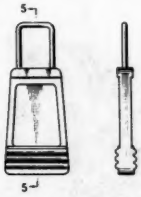


303,941
LINK CHAIN FOR BRACELET OR THE LIKE
Alain-Dominique Perrin, Rueil-Malmaison, France, assignor to Cartier International B.V., Amsterdam, Netherlands
Filed Oct. 16, 1987, Ser. No. 109,124
Claims priority, application France, Apr. 17, 1987, 87 2309
Term of patent 14 years
U.S. Cl. D11—21

303,942
CORNER SUPPORT BRACKET FOR PLAQUES OR THE LIKE
Charles E. Bottcher, Redbud Rd., Oneonta, Ala. 35121
Filed May 29, 1986, Ser. No. 867,755
Term of patent 14 years
U.S. Cl. D11—164



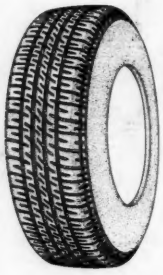
303,943
SLIDER PULL TAB FOR SLIDE FASTENER
Hiroo Minami, Uozu, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan
Filed Aug. 11, 1987, Ser. No. 83,960
Claims priority, application Japan, Apr. 25, 1987, 62-16202
Term of patent 14 years
U.S. Cl. D11—221



303,944
AUTOMOBILE TIRE
Yasuo Himuro, and Hidenori Masuda, both of Tokyo, Japan, assignors to Bridgestone Corporation, Tokyo, Japan
Filed Mar. 25, 1987, Ser. No. 30,783
Claims priority, application Japan, Sep. 25, 1986, 61-37594
Term of patent 14 years
U.S. Cl. D12—146

303,945
AUTOMOBILE TIRE
Toru Tsuda, and Yuji Sakamaki, both of Tokyo, Japan, assignors to Bridgestone Corporation, Tokyo, Japan
Filed May 6, 1987, Ser. No. 46,494
Claims priority, application Japan, Dec. 16, 1986, 61-49522
Term of patent 14 years
U.S. Cl. D12—147

303,946
TIRE
Maurice Graas, Luxembourg City, Luxembourg, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Jun. 15, 1987, Ser. No. 61,992
Claims priority, application Japan, Jan. 8, 1987, 62-000126
Term of patent 14 years
U.S. Cl. D12—147

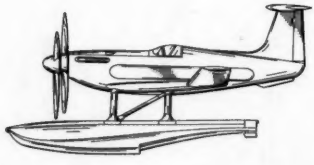


303,947
REARVIEW MIRROR
Yehuda Yehuda, 25 Messada Street, Ramat HaSharon, Israel
Filed Jan. 27, 1987, Ser. No. 7,382
Claims priority, application Israel, Jul. 27, 1986, 11820
Term of patent 14 years
U.S. Cl. D12—187

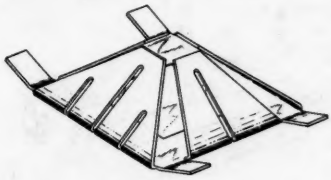
303,948
SUN VISOR
Douglas L. Bonstead, Ankeny, and Herbert O. Dixon, West Des Moines, both of Iowa, assignors to Deflecta-Shield Corporation, West Des Moines, Iowa
Filed Nov. 13, 1987, Ser. No. 119,991
Term of patent 14 years
U.S. Cl. D12—191

303,949
VEHICLE WHEEL
Toshiki Nakatsuka, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Oct. 22, 1986, Ser. No. 922,097
Term of patent 14 years
U.S. Cl. D12—211

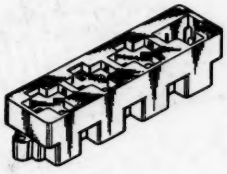
303,950
SEAPLANE WITH PONTOONS
Samuel C. Burgess, P.O. Box 3224, San Antonio, Tex. 78211
Filed Oct. 8, 1986, Ser. No. 916,861
Term of patent 14 years
U.S. Cl. D12—324



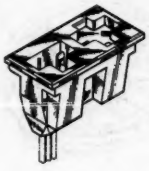
303,951
HEAT-SINK COVER FOR LEADLESS ELECTRONIC CHIP-CARRIER SOCKETS
Alfred F. McCarthy, Belmont, N.H., assignor to Aavid Engineering, Inc., Laconia, N.H.
Filed Mar. 27, 1986, Ser. No. 847,020
Term of patent 14 years
U.S. Cl. D13—23



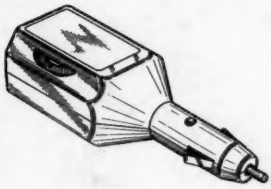
303,952
ELECTRICAL CONNECTOR
Douglas Drew, Toronto, Canada, assignor to Noma Inc., Scarborough, Canada
Filed Dec. 24, 1986, Ser. No. 947,463
Term of patent 14 years
U.S. Cl. D13—30



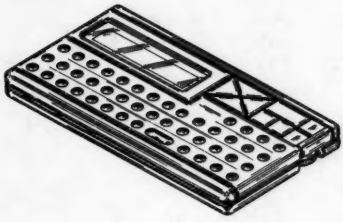
303,953
ELECTRICAL CONNECTOR
Douglas Drew, Toronto, Canada, assignor to Noma Inc., Scarborough, Canada
Filed Dec. 24, 1986, Ser. No. 947,466
Term of patent 14 years
U.S. Cl. D13—30



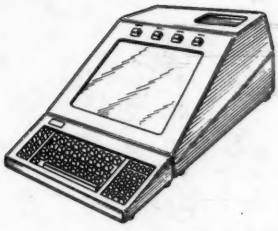
303,954
TAPE PLAYER ADAPTER FOR CAR RADIOS
Dennis Michels, New York, N.Y.; Alan Kaplan, West Orange, and Vincent Fusco, Clifton, both of N.J., assignors to Sound Sender, Inc., East Hanover, N.J.
Filed Nov. 8, 1985, Ser. No. 804,370
Term of patent 14 years
U.S. Cl. D14—155



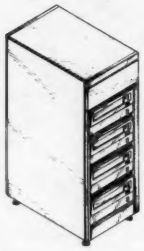
303,955
POCKET COMPUTER
Hajime Shiozawa, and Keiichi Koyama, both of Osaka, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Nov. 12, 1986, Ser. No. 929,669
Claims priority, application Japan, May 12, 1986, 6117915
Term of patent 14 years
U.S. Cl. D14—100



303,956
COMPUTER DISPLAY TERMINAL
Richard J. Ditzik, 10929 Clairemont Mesa Blvd., San Diego, Calif. 92124
Filed Jul. 31, 1986, Ser. No. 892,070
Term of patent 14 years
U.S. Cl. D14—106

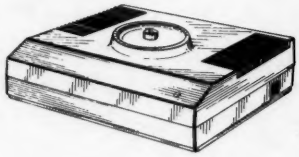


303,957
OPTICAL DISK UNIT FOR ELECTRONIC COMPUTERS
Shingo Nakamura, and Norio Shibuya, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan
Filed Dec. 18, 1986, Ser. No. 943,295
Claims priority, application Japan, Jun. 19, 1986, 61-23876
Term of patent 14 years
U.S. Cl. D14—109

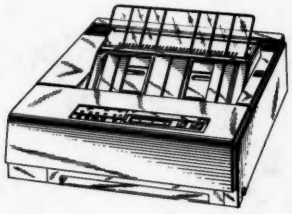


303,958
CARD SHROUD ENCLOSURE FOR AN INDUSTRIAL COMPUTER
William V. Cranston, III; Randall W. Martin, both of Boca Raton, and Mark A. Young, Lake Worth, all of Fla., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Sep. 25, 1986, Ser. No. 910,514
Term of patent 14 years
U.S. Cl. D14—114

303,959
BASE FOR DISPLAY MONITOR
Tsutomu Suyama; Masaharu Wakamatsu, both of Amagasaki; Takahiko Yamamuro, and Kazuyuki Fukushima, both of Nagasaki, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Dec. 8, 1986, Ser. No. 938,912
Claims priority, application Japan, Jun. 9, 1986, 61-22187
Term of patent 14 years
U.S. Cl. D14—114

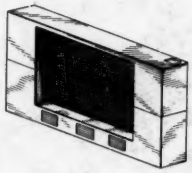


303,960
FACSIMILE
Kawamura Toru, Aichi, and Takagi Katsunori, Hyogo, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Japan
Filed Jan. 12, 1987, Ser. No. 2,344
Claims priority, application Japan, Jul. 14, 1986, 61-27466
Term of patent 14 years
U.S. Cl. D14—118

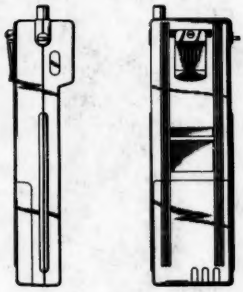


303,961
REEL FOR A VIDEO TAPE RECORDER
Suk E. Kim, Cheonan, Rep. of Korea, assignor to SKC Limited, Kyohgki, Rep. of Korea
Filed Dec. 31, 1986, Ser. No. 948
Claims priority, application Rep. of Korea, Jul. 5, 1986, 86-9569
Term of patent 14 years
U.S. Cl. D14—122

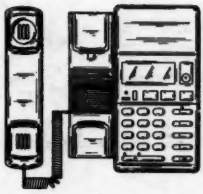
303,962
OUTDOOR VIDEO DISPLAY UNIT
Tohru Asou, Nagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Jan. 27, 1986, Ser. No. 822,552
Claims priority, application Japan, Jul. 27, 1985, 60-32171
Term of patent 14 years
U.S. Cl. D14—128



303,963
PORTABLE TELEPHONE
Mitsuharu Kokihara, Tokyo, Japan, assignor to Fujitsu Limited, Kawasaki, Japan
Filed Jun. 28, 1988, Ser. No. 212,724
Claims priority, application Japan, Jan. 14, 1988, 63-1323
Term of patent 14 years
U.S. Cl. D14—138

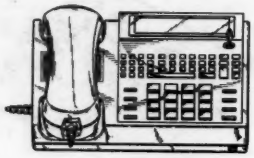


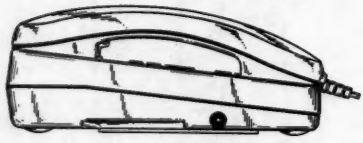
303,964
COMBINATION HANDSET TRANSCEIVER AND MESSAGE RECORDER TELEPHONE STAND THEREFOR
Satoshi Fukutome, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Aug. 30, 1988, Ser. No. 238,880
Claims priority, application Japan, Mar. 3, 1988, 63-9009
Term of patent 14 years
U.S. Cl. D14—141



303,965
BASE FOR TELEPHONE SET
Edmond J. Helstab, Ottawa, Canada, assignor to Northern Telecom Limited, Montreal, Canada
Filed Mar. 8, 1988, Ser. No. 165,680
Term of patent 14 years
U.S. Cl. D14—142

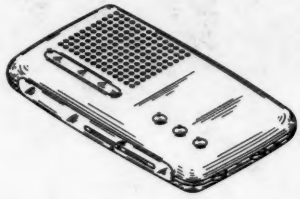
303,966
TELEPHONE STATION
Jochen Fritzsche, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany
Filed Jul. 25, 1988, Ser. No. 223,375
Claims priority, application Fed. Rep. of Germany, Feb. 29, 1988, BD.IORN.17704
Term of patent 14 years
U.S. Cl. D14—151





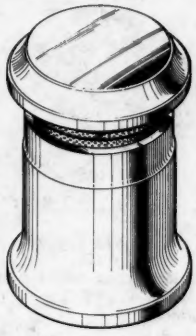
303,967
COMBINED CASSETTE PLAYER AND RADIO RECEIVER FOR THE BLIND
Myung C. Shin, Daekushi, Rep. of Korea, assignor to Gold Star Co., Ltd., Seoul, Rep. of Korea
Filed Feb. 28, 1986, Ser. No. 838,029
Claims priority, application Rep. of Korea, Sep. 30, 1985, 13986/1985
Term of patent 14 years
U.S. Cl. D14—162

303,968
CLOCK RADIO
Kazuo Tsujimoto, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Nov. 17, 1987, Ser. No. 121,726
Claims priority, application Japan, May 21, 1987, 62-20201
Term of patent 14 years
U.S. Cl. D14—171



303,969
RADIO PAGER OR SIMILAR ARTICLE
William J. Scheid; John M. McKee, both of Coral Springs; Robert Kurcbart, Boca Raton; Joseph V. Ranalletta, Coral Springs; John R. Benyo, and Richard J. Toth, both of Boca Raton, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.
Filed Oct. 15, 1986, Ser. No. 919,337
Term of patent 14 years
U.S. Cl. D14—191

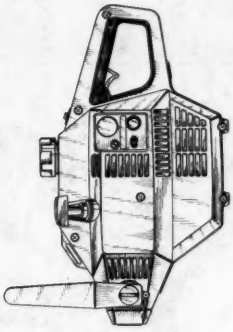
303,970
OUTDOOR LOUDSPEAKER
Martin W. Collins, Windermere, Fla., and William B. Smith, San Diego, Calif., assignors to SoundScape Speakers, Inc., Windermere, Fla.
Filed Nov. 21, 1986, Ser. No. 933,694
Term of patent 14 years
U.S. Cl. D14—216

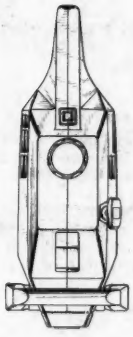


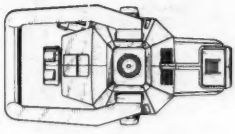
303,971
TWIN FUNCTION GRAPHIC EQUALIZER
Shiro Arai, 1-8-24, Kibogaoka, Chikusaku, Nagoya 464, Japan
Filed Mar. 31, 1986, Ser. No. 817,434
Term of patent 14 years
U.S. Cl. D14—217

303,972
ANTENNA FOR A MINI SATELLITE EARTH STATION
Takao Uozumi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan
Filed Jul. 23, 1986, Ser. No. 888,379
Claims priority, application Japan, Feb. 27, 1986, 61-7105
Term of patent 14 years
U.S. Cl. D14—231

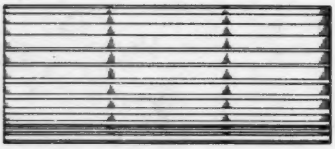
303,973
PORTABLE INTERNAL COMBUSTION ENGINE AND TOOLS
Katsumi Kiyooka, Warabi; Tetsuo Ueno, Higashiyamato; Keiko Iramina, Tachikawa, and Hideko Inomata, Higashiyamato, all of Japan, assignors to Komatsu Zenoah Company, Tokyo, Japan
Filed Jan. 16, 1986, Ser. No. 819,357
Claims priority, application Japan, Jul. 16, 1985, 60-030056; Jul. 29, 1985, 60-32067; Aug. 2, 1985, 60-032807
Term of patent 14 years
U.S. Cl. D15—10

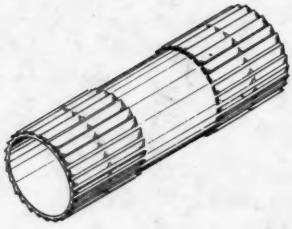




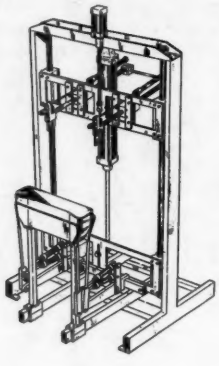


303,974
POWER ROLLER ELEMENT
Craig C. Karr, 1312 San Vicente Blvd., Santa Monica, Calif. 90402
Filed May 1, 1986, Ser. No. 858,515
Term of patent 14 years
U.S. Cl. D15—126



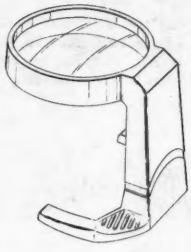


303,975
APPARATUS FOR APPLYING SEAT COVERS TO AUTOMOBILE BACKRESTS OR THE LIKE
Conny Hedenberg, Slädvägen 10, S-564 00 Bankeryd, Sweden, and Alfred Tillner, Richtstättenweg 1a, D-4513 Belm, Fed. Rep. of Germany
Filed Mar. 20, 1985, Ser. No. 714,197
Claims priority, application Fed. Rep. of Germany, Sep. 20, 1984, 59-1278
Term of patent 14 years
U.S. Cl. D15—199

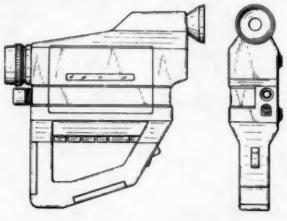


303,976
LENS FOR CAMERA
Hiroyuki Kimura, Tokyo, and Yoshiaki Hara, Utsunomiya, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Apr. 8, 1987, Ser. No. 35,707
Claims priority, application Japan, Oct. 15, 1986, 61-41055
Term of patent 14 years
U.S. Cl. D16—134

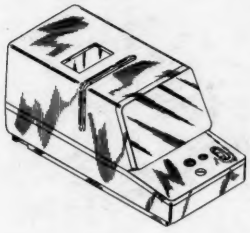
303,977
MAGNIFIER
Veronica G. Steel, London, England, and David F. Francis, Sydney, Australia, assignors to Combined Optical Industries Limited, United Kingdom
Filed Apr. 9, 1987, Ser. No. 36,284
Claims priority, application United Kingdom, Oct. 14, 1986, 1037361
Term of patent 14 years
U.S. Cl. D16—135



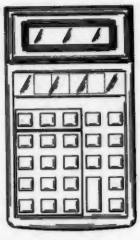
303,978
COMBINED VIDEO CAMERA AND RECORDER
Raymond C. Phinney, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Mar. 16, 1987, Ser. No. 25,866
Term of patent 14 years
U.S. Cl. D16—202



303,979
RECEIPT-JOURNAL PRINTER OR SIMILAR ARTICLE
Shuzo Kato, Hiratsuka; Satoru Sakama, Isehara, and Tamihei Takahashi, Atsugi, all of Japan, assignors to NCR Corporation, Dayton, Ohio
Filed Jul. 11, 1986, Ser. No. 884,817
Claims priority, application Japan, Mar. 27, 1986, 61-10934
Term of patent 14 years
U.S. Cl. D18—13



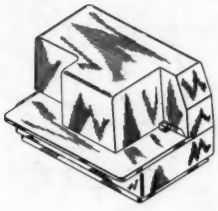
303,980
ELECTRONIC CALCULATOR
Takahisa Yubisui; Hiroshi Sakaguchi, and Toshiya Takahashi, all of Osaka, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Aug. 22, 1986, Ser. No. 899,501
Claims priority, application Japan, Feb. 25, 1986, 61-6910
Term of patent 14 years
U.S. Cl. D18—7



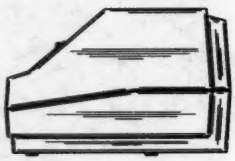
303,981
DEST-TOP ELECTRONIC CALCULATOR
Keiko Takemata, Tokyo, and Eiichi Yoshioka, Abiko, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Sep. 9, 1986, Ser. No. 905,256
Claims priority, application Japan, Mar. 14, 1986, 61-9256
Term of patent 14 years
U.S. Cl. D18—7

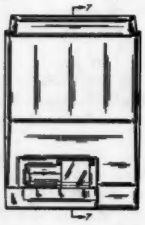
303,982
DESK-TOP ELECTRONIC CALCULATOR
Fumiya Matsuoka, Tokyo, and Takeshi Hasegawa, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Sep. 23, 1986, Ser. No. 910,774
Claims priority, application Japan, Mar. 27, 1986, 61-11240
Term of patent 14 years
U.S. Cl. D18—7

303,983
SLIP PRINTER OR SIMILAR ARTICLE
Shuzo Kato, Hiratsuka, and Shingo Watanabe, Fujizawa, both of Japan, assignors to NCR Corporation, Dayton, Ohio
Filed Jul. 11, 1986, Ser. No. 884,816
Claims priority, application Japan, Mar. 27, 1986, 61-10935
Term of patent 14 years
U.S. Cl. D18—13

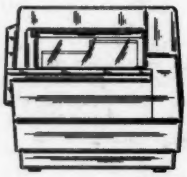


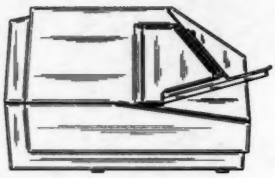
303,984
PRINTER FOR CASH REGISTER
Akira Tsuksda, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Aug. 19, 1986, Ser. No. 898,003
Claims priority, application Japan, Mar. 3, 1986, 61-7648
Term of patent 14 years
U.S. Cl. D18—13



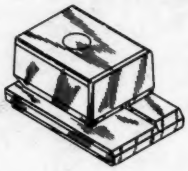


303,985
PRINTER FOR CASH REGISTER
Maki Tomoike, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Oct. 20, 1986, Ser. No. 922,109
Claims priority, application Japan, Apr. 22, 1986, 61-15404
Term of patent 14 years
U.S. Cl. D18—13





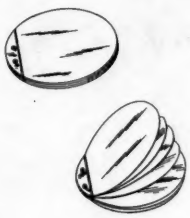
303,986
RECEIPT/SLIP PRINTER OR SIMILAR ARTICLE
Shuzo Kato, Hiratsuka, and Tamihei Takahashi, Atsugi, both of Japan, assignors to NCR Corporation, Dayton, Ohio
Filed Sep. 25, 1987, Ser. No. 101,342
Claims priority, application Japan, Apr. 30, 1987, 62-16664
Term of patent 14 years
U.S. Cl. D18—13



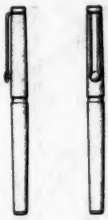
303,987
RECEIPT/JOURNAL PRINTER OR SIMILAR ARTICLE
Shuzo Kato; Yasushi Nakamura, both of Hiratsuka, and Masao Kusayanagi, Odawara, all of Japan, assignors to NCR Corporation, Dayton, Ohio
Filed Sep. 25, 1987, Ser. No. 101,345
Claims priority, application Japan, Mar. 30, 1987, 62-11682
Term of patent 14 years
U.S. Cl. D18—13

303,988
SUPPORT LEG FOR COMPUTER EQUIPMENT
Albert F. Buchweitz, Jr., Wheeling, and Bruce Heggeland, Palatine, both of Ill., assignors to IPD Innovative Plastic Designs Inc., Wheeling, Ill.
Filed Sep. 8, 1986, Ser. No. 905,254
Term of patent 14 years
U.S. Cl. D18—23

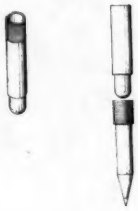
303,989
BOOK
Lucy Körner, Bahnhofstrasse 49, D-7012 Fellbach, Fed. Rep. of Germany
Filed Mar. 11, 1986, Ser. No. 842,433
Claims priority, application Fed. Rep. of Germany, Sep. 25, 1985, 1053; Sep. 27, 1985, 1056; Oct. 7, 1985, 1057; Feb. 3, 1986, 1058
Term of patent 14 years
U.S. Cl. D19—26



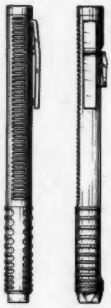
303,990
PEN
Tor Petterson, Rancho Palos Verdes, Calif., assignor to Pentel of America, Ltd., Torrance, Calif.
Filed Dec. 11, 1986, Ser. No. 940,642
Term of patent 14 years
U.S. Cl. D19—48



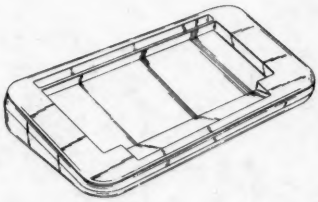
303,991
MINIATURE PEN WITH CAP
Kent D. Murphy, 8 Windermere, Gilford Road, Sandymount, Dublin 4, Ireland
Filed Dec. 22, 1986, Ser. No. 944,604
Term of patent 14 years
U.S. Cl. D19—48



303,992
RETRACTABLE HOLDER FOR AN ERASER OR SIMILAR ARTICLE
Gerald Grötsch, Fuerth, Fed. Rep. of Germany, assignor to J. S. Staedtler GmbH & Co., Nuremberg, Fed. Rep. of Germany
Filed Dec. 5, 1986, Ser. No. 938,741
Claims priority, application Fed. Rep. of Germany, Jun. 11, 1986, MRVII275
Term of patent 14 years
U.S. Cl. D19—53



303,993
NOTE PAD HOLDER
Michael J. Szablak, Stephens City, and Glen E. Tomblin, Winchester, both of Va., assignors to Rubbermaid Commercial Products, Inc., Winchester, Va.
Filed Oct. 24, 1986, Ser. No. 923,717
Term of patent 14 years
U.S. Cl. D19—78



303,994
CANDY DISPENSER
George C. Lee, 17879 Santa Valera St., Fountain Valley, Calif. 92708
Filed Aug. 26, 1986, Ser. No. 901,155
Term of patent 14 years
U.S. Cl. D20—7

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 10TH DAY OF OCTOBER, 1989

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. H. Robins Company, Incorporated: *See*—
Tomczuk, Bruce E.; and Sutherland, Deborah S., 4,873,251, Cl. 514-303.000.

A Nattermann & CIE GmbH: *See*—
Welter, Andre ; Fischer, Harmut; Christiaens, Leon; Wendel, Albrecht; Etschenberg, Eugen; Dereu, Norbert; Kuhl, Peter; and Graf, Eric, 4,873,350, Cl. 549-436.000.

A. O. Smith Corporation: *See*—
Kramer, David W., 4,872,833, Cl. 431-354.000.
Ruark, Darryl L., 4,872,443, Cl. 126-361.000.

A/S Ferrosan: *See*—
Watjen, Frank; and Hansen, Holger C., 4,873,244, Cl. 514-250.000.

Aalto, Erkki: *See*—
Vartiainen, Seppo; and Aalto, Erkki, 4,872,892, Cl. 55-345.000.

Aaltonen, Pirkko K.; and Siissalo, Ilkka T., to Cultor Oy. Fur animal feed and a method for preparing the same. 4,873,111, Cl. 426-623.000.

AB Fellingsbro Verkstader: *See*—
Brehmer, Roland; and Papi, Adolfo, 4,873,421, Cl. 219-341.000.

ABB Stal AB: *See*—
Pillai, Krishna K., 4,872,423, Cl. 122-4.00D.

Abbe, Ross E. Apparatus and method for removing the contents of a can. 4,872,802, Cl. 414-417.000.

Abbott Laboratories: *See*—
Summers, James B., Jr.; Gunn, Bruce P.; and Brooks, Dee W., 4,873,259, Cl. 514-443.000.
Wong, Martin, 4,873,035, Cl. 264-4.600.

Abe, Akira; Mihayashi, Keiji; and Ichijima, Seiji, to Fuji Photo Film Co., Ltd. Method for processing a silver halide color photographic material while replenishing washing water and stabilizing solution. 4,873,179, Cl. 430-382.000.

Abe, Nobuyasu: *See*—
Niwa, Katuhiro; Abe, Nobuyasu; Kajikiyo, Katuji; Suzuoki, Tsutomu; Tabuti, Katumi; and Arii, Yoshifumi, 4,872,383, Cl. 83-175.000.

Abe, Tomiya: *See*—
Taketani, Noriaki; Asano, Hideki; Endo, Akira; Abe, Tomiya; Ibamoto, Masahiko; Mukai, Junji; Tanno, Seikichi; Eguchi, Shuji; and Shimura, Masato, 4,873,030, Cl. 264-1.500.

Abe, Yoshihiro; and Nocolaou, Kyriacos C., to University of Pennsylvania. Method of synthesizing leukotriene B_4 and derivatives thereof. 4,873,024, Cl. 260-405.500.

Abeles, Joseph H.; Kastalsky, Alexander; and Lehemy, Robert F., to Bell Communications Research, Inc. Single quantum well optical modulator. 4,872,744, Cl. 350-356.000.

Abellana, Jovito N.; and Dolan, Donald T., to Pitney Bowes Inc. Platen module for a modular mailing machine. 4,872,521, Cl. 177-25.150.

Abernathy, Joseph V.: *See*—
Davis, Cecil J.; Abernathy, Joseph V.; Matthews, Robert T.; Hildenbrand, Randall C.; Simpson, Bruce; Jones, John I.; Loewenstein, Lee M.; and Bohlman, James G., 4,872,938, Cl. 156-345.000.

Abiko, Kenkichi: *See*—
Deya, Eiki; Yanahisa, Shuichi; Abiko, Kenkichi; and Kikuchi, Eiichi, 4,873,229, Cl. 514-54.000.

Abodishish, Hani A., to Westinghouse Electric Corp. Recovery of hafnium values from loaded extraction solvent. 4,873,072, Cl. 423-608.000.

Abolins, Visvaldis: *See*—
Holub, Fred F.; Abolins, Visvaldis; and Rock, John A., 4,873,287, Cl. 525-92.000.

Abou-Gharbia, Magid A.: *See*—
Childers, Wayne E., Jr.; and Abou-Gharbia, Magid A., 4,873,331, Cl. 544-295.000.

Abrams, Michael J.: *See*—
Jones, Alun G.; Davison, Alan; Kronauge, James; and Abrams, Michael J., 4,872,561, Cl. 206-569.000.

Abreo, William A., Jr., to Cameron Iron Works USA, Inc. Production tieback connector. 4,872,708, Cl. 285-39.000.

Absil, Robert P. L.; Angevine, Philip J.; Chester, Arthur W.; and Kirker, Garry W., to Mobil Oil Corporation. Lanthana-alumina-aluminum phosphate catalyst composition. 4,873,216, Cl. 502-211.000.

Abt, John: *See*—
Jackson, Richard A.; Abt, John; and Barnett, Ronnie D., 4,873,568, Cl. 358-22.000.

Acheson, Rees H. Automatic welding apparatus for weld build-up and method of achieving weld build-up. 4,873,419, Cl. 219-125.100.

Actel Corporation: *See*—
El Gamal, Abbas A.; El-Ayat, Khaled A.; Greene, Jonathan W.; Guo, Ta-Pen R.; and Reyneri, Justin M., 4,873,459, Cl. 307-465.000.

Adachi, Ikuo; Yamamori, Teruo; Ueda, Motohiko; and Sato, Hatsuo, to Shionogi & Co., Ltd. 4,7-dihydropyrazolo(3,4-b) pyridine derivatives. 4,873,334, Cl. 514-303.000.

Adachi, Nobukazu: *See*—
Kobayashi, Hiroo; Fujino, Hitoshi; Yagi, Tadashi; Adachi, Nobukazu; Hayakawa, Yasuyoshi; and Setoriyama, Takeshi, 4,873,548, Cl. 355-200.000.

Adam, Stephen F., to Lucas Weimschel, Inc. Extended range composite head power sensor with three circuit branches having a common node. 4,873,484, Cl. 324-95.000.

Adamik, John A.: *See*—
Wang, David N.; White, John M.; Law, Kam S.; Leung, Cissy; Umotoy, Salvador P.; Collins, Kenneth S.; Adamik, John A.; Perlov, Ilya; and Maydan, Dan, 4,872,947, Cl. 156-643.000.

Adams, Kevin T. Tilt-bed trailer. 4,872,728, Cl. 298-5.000.

Adams, Michael J., to British Telecommunications public limited company. Optical switch. 4,873,690, Cl. 372-8.000.

Addie, Graeme R.; and Visintainer, Robert J., to GIW Industries, Inc. Slurry pump having increased efficiency and wear characteristics. 4,872,809, Cl. 415-206.000.

Advanced Polymer Systems, Inc.: *See*—
Jankower, Laura J.; and Shipley, Larry W., 4,873,091, Cl. 424-489.000.

Aerospatiale Societe Nationale Industrielle: *See*—
Vaillant De Guelis, Hubert; and Joly, Jean-Louis, 4,872,357, Cl. 74-5.100.

Agency of Industrial Science and Technology: *See*—
Matsui, Haruo; Nakagawa, Ippei; and Kato, Kiyotaka, 4,873,073, Cl. 423-617.000.

Agfa-Gevaert Aktiengesellschaft: *See*—
Wiesen, Heinz; and Wolff, Erich, 4,873,338, Cl. 546-293.000.
Zahn, Wolfgang; Fursich, Manfred; Nitsch, Wilhelm; Rauh, Hans-Jurgen; and Treiber, Helmut, 4,873,546, Cl. 355-38.000.

Agintec AG: *See*—
Maier, Hans P., 4,872,712, Cl. 285-341.000.

Agostino, Michael. Dual float valve control for regular and douglas type valve. 4,872,473, Cl. 137-270.000.

Agrawal, Rakesh; and Auvil, Steven R., to Air Products and Chemicals, Inc. Process for the production of high pressure nitrogen. 4,872,893, Cl. 62-11.000.

Aguilo', Adolfo: *See*—
Murphy, Mark A.; Smith, Brad L.; Aguilo', Adolfo; and Tau, Kwoliang D., 4,873,378, Cl. 568-867.000.

Aidlin Automation Corp.: *See*—
Aidlin, Samuel S.; Aidlin, Stephen H.; Bailey, Russell O.; and Myers, Ed, 4,873,410, Cl. 219-56.100.

Aidlin, Samuel S.; Aidlin, Stephen H.; Bailey, Russell O.; and Myers, Ed, to Aidlin Automation Corp. Parallel gap welder. 4,873,410, Cl. 219-56.100.

Aidlin, Stephen H.: *See*—
Aidlin, Samuel S.; Aidlin, Stephen H.; Bailey, Russell O.; and Myers, Ed, 4,873,410, Cl. 219-56.100.

Aikawa, Renji: *See*—
Morishita, Masataka; Aikawa, Renji; Katsuragi, Shigeo; Yamamoto, Yoshiaki; and Sugimoto, Kenichi, 4,873,087, Cl. 424-433.000.

Aikawa, Yukihiro: *See*—
Tada, Tomio; Hirobe, Junichi; Takamatsu, Junichi; Hori, Kazuto; and Aikawa, Yukihiro, 4,873,549, Cl. 355-206.000.

Aime, Jean-Marc; Mention, Georges; and Thouzeau, Andre , to Charbonnages De France. Polyurethane-carbohydrate-based substances which can be calendered to produce biodegradable materials. 4,873,270, Cl. 523-128.000.

Air Concepts, Inc.: *See*—
Brown, Carlton E.; and de Pagter, Pierre C., 4,872,400, Cl. 98-115.300.

Air Products and Chemicals, Inc.: *See*—
Agrawal, Rakesh; and Auvil, Steven R., 4,872,893, Cl. 62-11.000.
Garg, Diwakar; Dyer, Paul N.; and Dimos, Duane, 4,873,152, Cl. 428-627.000.
Jarrett, Jawrence P., 4,872,482, Cl. 137-554.000.
Schweighardt, Frank K.; Bailey, Webb I.; Lileck, John T.; Graybill, John K.; and Lutz, Eugene G., 4,873,315, Cl. 570-130.000.

Aisan Industry Co., Ltd.: *See*—
Sonoda, Hidefumi; Mori, Eiji; Kawase, Mitsuo; Yoneshige, Kazuhiro; Takahashi, Akira; Komiya, Hirokazu; and Tanaka, Akira, 4,872,439, Cl. 123-518.000.

Aisan Kogyo Kabushiki Kaisha: *See*—
Yamada, Yutaka; Kozawa, Tadashi; Natsume, Naohiro; and Komatsubara, Hirofumi, 4,872,806, Cl. 415-55.500.

Aisin Seiki Kabushiki Kaisha: *See*—
Katsuo, Suzaki, 4,873,526, Cl. 342-359.000.

Aizawa, Yuichi: *See*—
Yoshioka, Takao; Kansi, Tsutomu; Aizawa, Yuichi; Horikoshi, Hiroyoshi; and Hasegawa, Kazuo, 4,873,255, Cl. 514-369.000.

Ajinomoto Co., Inc.: *See*—
Sasaki, Hitoshi; and Igota, Shoji, 4,872,590, Cl. 220-457.000.

Akao, Shigeaki; Ishida, Noboru; and Kawamura, Mitsuyoshi, to NGK Spark Plug Co., Ltd. Internal combustion engine with ceramics valves. 4,872,431, Cl. 123-188.0AA.

Akashi, Takamichi: *See*—
Hirayama, Shigemitsu; Akashi, Takamichi; Ikuta, Akio; Sasaki, Isao; and Fukuda, Hiroshi, 4,872,974, Cl. 210-90.000.

Akatsu, Yohsuke; Fukushima, Naoto; Fukunaga, Yukio; Hano, Sunao; and Satoh, Masaharu, to Nissan Motor Company, Limited. Acitively controlled automotive suspension system with adjustable response characteristics in pitching-suppressive control. 4,872,701, Cl. 280-703.000.

Akebono Brake Industry Co., Ltd.: *See*—
Sakai, Takashi, 4,872,584, Cl. 220-201.000.

Akebono Research and Development Centre Ltd.: *See*—
Sakai, Takashi, 4,872,584, Cl. 220-201.000.

Akhtar, Masud; and Weakliem, Herbert A., to Chronar Corp. Catalytic deposition of semiconductors. 4,873,119, Cl. 427-39.000.

Akhtar, Maysood: *See*—
LaCourse, William C.; and Akhtar, Maysood, 4,872,896, Cl. 65-30.140.

Akiba, Takesada: *See*—
Etoh, Jun; Shimohigashi, Katsuhiro; Miyazawa, Kazuyuki; Kimura, Katsutaka; and Akiba, Takesada, 4,873,672, Cl. 365-218.000.

Akiyama, Setsuo: *See*—
Yoshikawa, Masato; Fukuura, Yukio; Akiyama, Setsuo; Nakamura, Makoto; Naito, Kazuo; and Honda, Toshio, 4,872,932, Cl. 156-151.000.

Akiyama, Sigeo, to Matsushita Electric Works, Ltd. Solid state relay and method of manufacturing the same. 4,873,202, Cl. 437-62.000.

Akkermans, Gerardus P. M., to AT&T and Philips AT&T Philips Telecommunications B.V. Decoding unit for CMI-encoded signals. 4,873,524, Cl. 341-73.000.

Akzo N.V.: *See*—
Dimantoglou, Michael; and Kuhne, Helmut, 4,872,983, Cl. 210-500.290.

Alberts, Alfred W.; and Greenspan, Michael D., to Merck & Co., Inc. Treatment of diabetic ketoacidosis. 4,873,260, Cl. 514-449.000.

Albom, Bradley S.: *See*—
Mezei, Louis M.; Albom, Bradley S.; Coppock, Stan; Moehle, Stephen J.; Noorda, Brent S.; Widunas, Joseph T.; and Zeitlin, James A., 4,873,633, Cl. 364-413.080.

Alcan International Limited: *See*—
Enright, Philip G.; Hobbis, Andrew J.; and Tapping, Ronald E., 4,872,908, Cl. 75-68.00R.
Gnyra, Bohdan, 4,873,209, Cl. 501-95.000.
Jenkins, Dianne M.; and Pargeter, Christopher, 4,873,047, Cl. 264-322.000.

Alden, Charles: *See*—
Alden, Kevin; and Alden, Charles, 4,872,352, Cl. 73-861.770.

Alden, Kevin; and Alden, Charles, to Alden, Kevin. Flow meter pulse transmitter. 4,872,352, Cl. 73-861.770.

Alderman, George W., to American National Can Company. Compound application detector. 4,873,432, Cl. 250-227.000.

Alewelt, Wolfgang: *See*—
Jakob, Wolfgang; Alewelt, Wolfgang; and Tresper, Erhard, 4,873,326, Cl. 540-538.000.

Alexander, Jack L. Air controller for burners. 4,872,832, Cl. 431-90.000.

Alexander, William B.; and Frenger, Paul, to Safe-Test, Inc. Testing device and method for inflatable objects. 4,873,654, Cl. 364-551.010.

Alexson, Charles E., to Minnesota Mining and Manufacturing Company. Bone rasp. 4,872,452, Cl. 128-92.0VJ.

Alfa Lancia Industriale S.p.A.: *See*—
Pristera, Raffaele; Rugora, Edoardo; Fioravazzi, Silvio; Guelfi, Giorgio; Bassi, Aldo; and Poli, Alberto, 4,873,451, Cl. 307-10.100.

Alfa-Laval Thermal AB: *See*—
Nilsson, Mats; Tagesson, Bernt; and Novak, Ladislav, 4,872,506, Cl. 165-166.000.

Alfred University: *See*—
LaCourse, William C.; and Akhtar, Maysood, 4,872,896, Cl. 65-30.140.

Algor, Marshall M., to United States of America, Army. Fast rise pulse oscillator. 4,873,499, Cl. 331-117.00R.

Algra, Gerben P.: *See*—
Erkens, Leonardus J. H.; Algra, Gerben P.; Snijders, Jacobus M. H.; Geurts, Herman J. J. M.; and Pugin, Andre , 4,872,915, Cl. 106-433.000.

Allan, John L.; Boettcher, Jeffery J.; Gaylord, Norman G.; and Katz, Leon, to James River-Norwalk, Inc. Epoxide coating composition. 4,873,273, Cl. 523-407.000.

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Porco, Carmen R., 4,873,712, Cl. 379-58.000.

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Beuhler, Allyson; and Wrezel, James A., 4,873,302, Cl. 526-333.000.
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Marshall, Robert M., 4,873,144, Cl. 428-395.000.
Swan, Ellen L.; Basu, Rajat S.; Lund, Earl A. E.; and Wilson, David P., 4,873,015, Cl. 252-171.000.

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AM International Corporation: *See*—
Niemeyer, Robert H., III, 4,873,538, Cl. 346-139.00R.

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Klemmensen, Ramon L., 4,872,318, Cl. 62-137.000.

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Kanehira, Katsuyaki; Takayama, Syuichi; Amano, Atsushi; Hibino, Hiroki; Uchiyama, Naoki; and Nakada, Akio, 4,872,458, Cl. 128-401.000.

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American Cyanamid Company: *See*—
Luh, Yuhshi; and Forgione, Peter S., 4,873,365, Cl. 560-345.000.

American Home Products Corporation: *See*—
Childers, Wayne E., Jr.; and Abou-Gharbia, Magid A., 4,873,331, Cl. 544-295.000.
Kinney, William A.; and Lee, Nancy E., 4,873,238, Cl. 514-227.800.
Leonard, Thomas W.; Mikula, Karol Kay; and Schlesinger, Marcia S., 4,873,266, Cl. 514-653.000.
Mobilio, Dominick, 4,873,257, Cl. 514-410.000.

American Matrix, Inc.: *See*—
Weaver, Samuel C.; and Nixdorf, Richard D., 4,873,069, Cl. 423-345.000.

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Alderman, George W., 4,873,432, Cl. 250-227.000.

American Optical Corporation: *See*—
Lummis, David J.; and Masso, Jon D., 4,872,749, Cl. 351-44.000.

American Stamp, Inc.: *See*—
Brewen, Ronnie M.; and Lloyd, David A., 4,872,706, Cl. 283-81.000.

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Brendgord, Thomas; Sanders, Ward L.; and Coon, Dennis C., 4,872,656, Cl. 269-322.000.

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Baranyai, Lawrence; and Scordo, Dominick, 4,873,663, Cl. 365-73.000.
Chamzas, Christodoulos, 4,873,577, Cl. 358-426.000.
Hokanson, John L.; Smeltz, Palmer D., Jr.; Yanushefski, Katherine A.; Yanushefski, Michael J.; and Young, Craig A., 4,873,566, Cl. 357-74.000.

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Antreasyan, Arsam; Garbinski, Paul A.; Mattera, Vincent D., Jr.; and Temkin, Henryk, 4,873,558, Cl. 357-23.200.
Brady, Patrick K., 4,873,716, Cl. 379-134.000.
Davidson, Wayne A.; Ernst, John P.; Herkes, Marybeth; Kuppuswami, Ram; Satalich, Timothy A.; and Stanaway, John J., Jr., 4,873,717, Cl. 379-157.000.
Fleming, James W.; Johnson, David W., Jr.; MacChesney, John B.; and Pardenek, Sandra A., 4,872,895, Cl. 65-18.100.
Friesen, Harold W.; and Nutt, Wendell G., 4,873,393, Cl. 174-34.000.
Myer, Robert E., 4,873,492, Cl. 330-86.000.
Myers, Clyde J.; Stephenson, Daniel L.; and Travieso, Ruben, 4,872,736, Cl. 350-96.200.

Ames, Douglas A., to Transphase Systems, Inc. Nestable, stackable containers. 4,872,557, Cl. 206-504.000.

Ametek, Inc.: *See*—
Meyers, Peter V.; Liu, Chung-Heng; and Frey, Timothy J., 4,873,198, Cl. 437-5.000.

Amgen: *See*—
Arakawa, Tsutomu, 4,873,312, Cl. 530-351.000.

Amoco Corporation: *See*—
Anderson, Ronald L., 4,873,009, Cl. 252-49.600.
Chang, Yuehsiung, 4,873,007, Cl. 252-40.700.
Fjare, Krisati A., 4,873,361, Cl. 560-130.000.
Hagen, Gary P.; and Nemo, Thomas E., 4,873,386, Cl. 585-471.000.

Hepp, Vincent R., 4,873,636, Cl. 364-422.000.
McVay, David R.; Carter, Lawrence D.; Jonasky, John D.; and Jefferson, Chris A., 4,872,939, Cl. 156-354.000.
AMP Incorporated: *See—*
Grabbe, Dimitry G., 4,873,615, Cl. 361-395.000.
Grebe, Robert K.; Lucius, John E.; and Szczesny, David S., 4,872,844, Cl. 439-69.000.
Korsunsky, Iosif; Walker, Kevin E.; and Brown, Robert W., 4,872,845, Cl. 439-70.000.
Long, William B., 4,872,849, Cl. 439-209.000.
Pooley, Denis M.; and MacKenzie, Douglas K., deceased, 4,872,856, Cl. 439-783.000.
Webster, Van K., 4,872,853, Cl. 439-327.000.
Ampex Corporation: *See—*
Baranski, Antoni S., 4,873,593, Cl. 360-96.500.
Ancker, Fred H., to Union Carbide Chemicals and Plastics Company Inc. Method of preparing mixtures of incompatible hydrocarbon polymers. 4,873,116, Cl. 428-36.900.
Anderson, Alan C.: *See—*
Bennitt, Robert A.; and Anderson, Alan C., 4,872,395, Cl. 92-139.000.
Anderson, Anthony T.; and Field, Nathaniel L., to Ford Motor Company. Method of making low friction finger follower rocker arms. 4,872,429, Cl. 123-90.440.
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Anderson, Keith G., to Ethyl Corporation. White bis-imide flame retardants. 4,873,341, Cl. 548-462.000.
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McIntyre, John M.; Anderson, Kenneth W.; Rao, Nancy A.; and Hickner, Richard A., 4,872,961, Cl. 204-181.700.
Anderson, Martin; and Brinnand, Anthony G., to Du Pont de Nemours, E. I., and Company. Pesticidal benzoylurea compounds. 4,873,327, Cl. 544-59.000.
Anderson, Patricia P.; Sivavec, Timothy M.; and Takekoshi, Tohru, to General Electric Company. Method for preparing 4-hydroxy-3-phenylbenzoic acid. 4,873,367, Cl. 562-425.000.
Anderson, Randall R.: *See—*
Dickinson, Ben W. O.; Dickinson, Robert W.; Anderson, Randall R.; Dickinson, Eric W.; and Wilkes, Robert D., 4,872,509, Cl. 166-278.000.
Anderson, Richard N., to Hunter Douglas Inc. Vertical louvre blind traveller bridle. 4,872,499, Cl. 160-168.100.
Anderson, Ronald L., to Amoco Corporation. Borated lube oil additive. 4,873,009, Cl. 252-49.600.
Andersson, Alf O.; and Warnqvist, Bjorn S. Process for recovering energy and chemicals from spent liquor in pulp preparation. 4,872,950, Cl. 162-15.000.
Anderton, Randy. Measuring device. 4,872,267, Cl. 33-463.000.
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Angara, Rao V. Calendar assembly. 4,872,277, Cl. 40-117.000.
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Absil, Robert P. L.; Angevine, Philip J.; Chester, Arthur W.; and Kirker, Garry W., 4,873,216, Cl. 502-211.000.
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Anstey, Michael J., to Dowty Electronic Components Limited. Interconnection systems for electrical circuits. 4,872,843, Cl. 439-69.000.
Antonas, Adamantios, to Therm-O-Disc, Incorporated. Encapsulated thermal protector. 4,873,507, Cl. 338-22.00R.
Antreasyan, Arsam; Garbinski, Paul A.; Mattera, Vincent D., Jr.; and Temkin, Henryk, to American Telephone and Telegraph Company, AT&T Bell Laboratories. Group III-V compound field effect transistor with diffusion barrier. 4,873,558, Cl. 357-23.200.
Aoki, Isao; Kuragano, Takashi; Okajima, Nobuyuki; and Okada, Yoshiyuki, to Takeda Chemical Industries, Ltd. Herbicidal pyrazole sulfonyl Imino-2H-1,2,4-thiadiazolo[2,3-a9 pyrimidines. 4,872,901, Cl. 71-90.000.
Aoki, Noboru: *See—*
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Aoki, Takashi: *See—*
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Aoki, Yoshiaki: *See—*
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Aoyama, Hiroshi: *See—*
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Aoyama, Susumu: *See—*
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Appelmann, Horst, to C. J. Rush Inc. Quarter point return mechanism for manually operated revolving doors. 4,872,285, Cl. 49-42.000.
Appleby, John M.; Bolsworth, James; and Wilson, Charles M., to General Motors Corporation. Hood release assembly with integral snap in retention at instrument panel. 4,872,366, Cl. 74-501.600.
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Arai, Kiyotaka: *See—*
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Arai, Koichi; and Yoshizaki, Hideo, to Kowa Co, Ltd. Placenta-derived anticoagulating substance. 4,873,222, Cl. 514-21.000.
Arai, Kunio; Nishiyama, Hiromi; Aoyama, Hiroshi; and Kanaya, Yasuhiko, to Hitachi Seiko Ltd. Method of drilling printed circuit board. 4,872,787, Cl. 408-1.00R.
Arakawa, Tsutomu, to Amgen. Method for purifying interferon and composition of matter produced thereby. 4,873,312, Cl. 530-351.000.
Arbeniev, Alexandr S.; Ignatiev, Alexandr A.; Zhilin, Vitaly A.; Melnikov, Alexandr S.; and Tomskikh, Sergei F., to Vladimirsky Politekhnichesky Institut Glavnoe Territorialone Upravlenie Po Stroitelstvu Vo. Method and apparatus for processing a mix, preferably concrete mix. 4,872,760, Cl. 366-7.000.
Arch, Jonathan R., to Beecham Group p.l.c. Method for administering ethanolamine derivatives to livestock. 4,873,240, Cl. 514-231.500.
Archer Air Industries, Inc.: *See—*
Archer, Virgil L., 4,873,107, Cl. 426-520.000.
Archer, Gary D.; Huff, Eugene G.; Madrid, Miguel T., Jr.; and Yoshii, Akio, to International Business Machines Corporation. Method and apparatus for extending collation functions of a sorting program. 4,873,625, Cl. 364-200.000.
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Shawl, Edward T.; and Kesling, Haven S., Jr., 4,873,364, Cl. 560-344.000.
Areaux, Larry D., to Pre-Melt Systems, Inc. Metal chip furnace charge apparatus and method. 4,872,907, Cl. 75-65.00R.
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Arikawa, Tetsuro, to Nippon ABS, Ltd. Anti-skid control apparatus for a vehicle braking system. 4,872,729, Cl. 303-92.000.
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Armstrong World Industries, Inc.: *See—*
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Arnold, Kraft-Ulrich; and Clauss, Fernand, to Siemens Aktiengesellschaft. Flow divider for gas chromatographs. 4,873,058, Cl. 422-89.000.
Aro Corporation, The: *See—*
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Arthurs, Edward; Goodman, Matthew S.; Kobrinski, Haim; and Vecchi, Mario P., to Bell Communications Research, Inc. Hybrid optical and electronic packet switch. 4,873,681, Cl. 370-3.000.
Artwick, Kert E.: *See—*
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Arvin Industries, Inc.: *See—*
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Trachman, Edward G.; Shih, Shan; and Arzoian, John, 4,872,375, Cl. 74-731.000.
Asada, Toshiyuki; Ushijima, Fumihiro; and Higashiyama, Yasuhiko, to Toyota Jidosha Kabushiki Kaisha. Transmission for a vehicle having

improved performance for shifting between speed stages. 4,872,376, Cl. 74-765.000.
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Asahi Glass Company, Ltd.: *See—*
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Asahi, Naotatsu: *See—*
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Asai, Tadamichi: *See—*
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Asakawa, Kazuo, to Fujitsu Limited. Force controlling system. 4,872,803, Cl. 414-730.000.
Asanae, Masumi; and Fumio, Kimura, to Hitachi Metals, Ltd. Image recording method. 4,873,540, Cl. 346-160.100.
Asano, Hideki: *See—*
Taketani, Noriaki; Asano, Hideki; Endo, Akira; Abe, Tomiya; Ibamoto, Masahiko; Mukai, Junji; Tanno, Seikichi; Eguchi, Shuji; and Shimura, Masato, 4,873,030, Cl. 264-1.500.
Asano, Katuhiko; and Suzuki, Takao, to Hitachi, Ltd. Superconducting coil refrigerating method and superconducting apparatus. 4,872,314, Cl. 62-49.100.
Asano, Motomu: *See—*
Hattori, Shuzo; Tagawa, Takashi; and Asano, Motomu, 4,873,709, Cl. 378-142.000.
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Umemoto, Mitsumasa; Asano, Tamotsu; Horie, Hironobu; Takagi, Akinobu; Tamura, Nobuyasu; and Nishida, Takeshi, 4,873,373, Cl. 568-637.000.
Asano, Yuji, to Brother Kogyo Kabushiki Kaisha. Self cleaning sheet for dissolving a photo-sensitive material containing microcapsules on both sides of substrate. 4,873,167, Cl. 430-138.000.
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Ashley, Andrew W.: *See—*
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Asquith, Janet L.; and Connor, Bonnie G. Emergency signal balloon apparatus. 4,872,414, Cl. 116-210.000.
Assaf, Gad, to Geophysical Engineering Company. Heat exchanger and systems and methods for using the same. 4,872,315, Cl. 62-94.000.
Astle, William H.: *See—*
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Elias, Eric; and Knapp, Karl E., 4,873,118, Cl. 427-39.000.
Oquendo, Javier N.; and Leone, Joseph A., 4,872,992, Cl. 210-659.000.
Atlas Powder Company: *See—*
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Aurness, Harold O.; and Mahler, Thomas G. Three stage combination replacement lock. 4,872,326, Cl. 70-133.000.
Ausiello, Francesco P.; Ricco, Mario; and De Matthaeis, Sisto Luigi, to Weber S.r.l. Fuel injection system with controlled injectors for diesel engines. 4,872,438, Cl. 123-514.000.
Austad, Eric D. Wound dressing and method of forming same. 4,872,450, Cl. 128-90.000.
Auth, Rudolf; Seidelmann, Lothar; and Maas, Heinz, to Thyssen Stahl AG. Process and plant for producing binder-free hot briquettes. 4,872,906, Cl. 75-5.000.
Automotive Products, plc: *See—*
Wimbush, Maurice J., 4,872,396, Cl. 92-169.100.
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Avakian, Roger W.: *See—*
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Avidan, Amos A.; and Johnson, David L., to Mobil Oil Corp. Single zone oligomerization of lower olefins to distillate under low severity in a fluid bed with tailored activity. 4,873,385, Cl. 585-415.000.
Avidan, Amos A.; and Johnson, David L., to Mobil Oil Corp. Conversion of light olefins to gasoline using low-temperature catalyst regeneration. 4,873,389, Cl. 585-533.000.
Azuma, Ichiro; Tokura, Seiichi; Nishimura, Shinichiro; and Seo, Hiroshi, to Murata Kikai Kabushiki Kaisha. Slow-releasing preparation. 4,873,092, Cl. 424-499.000.
B-ART S.r.l.: *See—*
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B & H Manufacturing Company, Inc.: *See—*
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Komatsu, Masato; Baba, Isao; Mikami, Takashi; Narukawa, Kiyotada; and Kanai, Tsuyoshi, 4,873,288, Cl. 525-194.000.
Baba, Takeshi; Matsuoka, Kazuhiko; Usui, Masayuki; Minoura, Kazuo; Someya, Atsushi; and Suzuki, Masayuki, to Canon Kabushiki Kaisha. Varifocal optical element. 4,872,743, Cl. 350-353.000.
Babuka, Robert; and Petrozello, James R., to International Business Machines Corp. Electrical connector with torsional contacts. 4,872,851, Cl. 439-267.000.
Bach, Hartwig C., to Monsanto Company. Acrylic fibers having superior abrasion/fatigue resistance. 4,873,142, Cl. 428-359.000.
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Bailey, James B.; Gibson, Robert R.; Nunley, Alvin, III; and Utz, Q. Wayne, to Techsonic Industries, Inc. Sonar depth sounder apparatus. 4,873,676, Cl. 367-98.000.
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Baratz, Alan E.; Clarke, Kathryn E.; Pollard, Melinda R.; Pozefsky, Diane P.; Rafalow, Lee M.; Siddall, William E.; and Gray, James P., to International Business Machines Corporation. Method for selecting least weight end node to end node route in a data communications network. 4,873,517, Cl. 340-825.030.

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Ittemann, Peter; and Eisenbarth, Philipp, 4,873,284, Cl. 524-548.000.
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Nowakowsky, Bernhard H.; Beck, Juergen; Hartmann, Heinrich; and Vamvakaris, Christos, 4,873,299, Cl. 526-73.000.
Rossy, Philip A.; Thyes, Marco; Franke, Albrecht; Koenig, Horst; Lehmann, Hans D.; Gries, Josef; Friedrich, Ludwig; and Lenke, Dieter, 4,873,246, Cl. 514-252.000.
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Arch, Jonathan R., 4,873,240, Cl. 514-231.500.

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Beeuwkes, Reinier, III, to Medical Products & Research. Quick-release device for jaw stabilization. 4,872,449, Cl. 128-87.00R.

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Ireland, John A., 4,873,401, Cl. 200-61.45M.

Benesch, Katharina: *See*—
Dong, Dennis F.; Noonan, Edward B.; Rogers, Derek J.; Clifford, Arthur L.; Benesch, Katharina; and Loftfield, Richard E., 4,872,957, Cl. 204-84.000.

Benner, Harold T., Jr.; and Dieterlen, Paul E., to R. A. Jones & Co. Inc. Apparatus for adjusting knives for a pouch form, fill, seal machine. 4,872,382, Cl. 83-152.000.

Bennitt, Robert A.; and Anderson, Alan C., to Dresser-Rand Company. Crosshead per se, and in combination with a connecting rod assembly and a piston rod. 4,872,395, Cl. 92-139.000.

Benson, Dan T., to Ingersoll-Rand Company. System for separating abrasive material from a fluid used in fluid jet cutting. 4,872,975, Cl. 210-99.000.

Bentley, Leroy, to Stewart Decatur Security Systems, Inc. Cell block security systems. 4,872,284, Cl. 49-16.000.

Benton, Terry L.; and Matthews, John H., to Pneumo Abex Corporation. Piston rod assembly including preloaded piston head and composite rod. 4,872,370, Cl. 74-579.00E.

Berg, Klaus; Idel, Karsten-Josef; and Grigo, Ulrich, to Bayer Aktiengesellschaft. Process for the production of polycarbonate solutions. 4,873,314, Cl. 528-487.000.

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Berkowitz, Gerard. Adaptor handle. 4,872,697, Cl. 280-304.500.

Bernardi, Sergio, to Selenia Industrie Elettroniche Associate S.p.A. Process for making monocrystalline HGCDTE layers. 4,872,943, Cl. 156-621.000.

Bertiller, Roland; Maier, Roland; and Weisser, Harald, to Mauser-Werke Oberndorf GmbH. Insert barrel with adjusting device. 4,872,390, Cl. 89-29.000.

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Blankemeyer, Robert L.; and Blankeyemer, James C., to Metokote Corporation. Transportable coating apparatus. 4,872,419, Cl. 118-713.000.

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Blanton, Keith A.; Finlay, William M.; Sinclair, Michael J.; and Tumblin, John E., to Ivex Corporation. Method of selectively retrieving video images from a video reproducer for simulating movement. 4,873,585, Cl. 358-335.000.

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Block, Aleck. Flap wheel. 4,872,292, Cl. 51-334.000.

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Bloom, Robert. Hair coloring applicator bottle. 4,872,594, Cl. 222-173.000.

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Appleby, John M.; Bolsworth, James; and Wilson, Charles M., 4,872,366, Cl. 74-501.600.

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Boocock, John R. B., to DuPont Canada Inc. Process for the dyeing of polymers of propylene, butene-1 and 4-methyl-pentene-1 using basic dye in an aqueous dye bath. 4,872,880, Cl. 8-513.000.

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Borer, Timothy J.: *See*—
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Bori, Jacques E. F., to Team Incorporated. Dental implant and method. 4,872,840, Cl. 433-173.000.

Bornack, Walter K., Jr.; and McNally, Keith R., to Union Camp Corporation. Water dispersible polyamide ester. 4,873,311, Cl. 528-272.000.

Borodin, Daniel J., to U.S. Automation Co. Die-less drawing method and apparatus. 4,872,923, Cl. 148-11.50R.

Borth, David E.; Wang, Chih-Fei; Rabe, Duane C.; and Labedz, Gerald P., to Motorola, Inc. TDMA radio system employing BPSK synchronization for QPSK signals subject to random phase variation and multipath fading. 4,873,683, Cl. 370-95.100.

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Bowes, Emmerson, to Mobil Oil Corporation. Catalytic dewaxing process using binder-free catalyst. 4,872,968, Cl. 208-111.000.

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Braden, Thomas M. Solid particulate aerosol generator. 4,872,786, Cl. 406-68.000.

Brady, Antonio. Waterproof inflatable massage air mattress. 4,872,229, Cl. 5-455.000.

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Brunner, Hans-Georg, to Ciba-Geigy Corporation. Cyclohexanediones and their use as plant growth regulators. 4,872,902, Cl. 71-105.000.

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Bucher, Michael S.; Russo, Paul J.; and Schaar, Robert J., to Procter & Gamble Company, The. Method for removing precipitated calcium citrate from juice pasteurization or sterilization equipment. 4,872,919, Cl. 134-3.000.

Buhler, Ulrich; Hofmann, Klaus; and Hahnke, Manfred, to Bayer Aktiengesellschaft. Mixtures of monoazo dyestuffs. 4,872,883, Cl. 8-639.000.

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Burgess, Billie J. Downrigger fishing line holder. 4,872,281, Cl. 43-43.120.

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Childress, Joseph B. Open top floatable barge repair box with barge to box sealing system. 4,872,781, Cl. 405-12.000.
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Szilagyi, Imre; Dekany, Gyula; Frank, Judit; Horvath, Gabor; and Kulcsar, Gabor, 4,873,348, Cl. 549-271.000.
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Chmurny, Alan B.; Gross, Akiva T.; Kupper, Robert J.; and Roberts, Rowena L., to W. R. Grace & Co. - Conn. Process for preparing as partyl-phenylalanine dipeptides. 4,873,359, Cl. 560-40.000.
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Christensen, Burton G.; Cama, Lovji D.; and Schmitt, Susan M., to Merck & Co., Inc. Process for chiral synthesis of 1-beta-methyl-carbapenem intermediates. 4,873,324, Cl. 540-200.000.
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Chronar Corp.: *See—*
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Chung, Chi H.; Rees, Theodore D.; and Turner, Ian, to Laserdrive Ltd. Apparatus and method for detecting and compensating for pit extension in an optical disk recording system. 4,873,680, Cl. 369-59.000.
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Erkens, Leonardus J. H.; Algra, Gerben P.; Snijders, Jacobus M. H.; Geurts, Herman J. J. M.; and Pugin, Andre , 4,872,915, Cl. 106-433.000.
Fechtig, Bruno; and Baschang, Gerhard, 4,873,322, Cl. 536-4.100.
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Clancy, Robert L., to Broncostat Pty. Limited. Non-adjuvenated vaccine. 4,873,090, Cl. 424-451.000.

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Clark, Jon E.: *See*—
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Clark, Thomas C. Solder containing electrical connector and method for making same. 4,872,846, Cl. 439-83.000.

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Clem, Kenneth R.; Heider, Kenneth J.; Kegerreis, James E.; and Shoukry, Ehsan I., to Exxon Research and Engineering Company. Multistage reforming with interstage aromatics removal. 4,872,967, Cl. 208-65.000.

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Club Mate Products Inc.: *See*—
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Coccia, Mario, to Farmitalia Carlo Erba S.r.l. Apparatus with safety locking members, for connecting a sytringe to a bottle containing a medicament. 4,872,494, Cl. 141-383.000.

Cohen, Martin P.; and D'Sidocky, Richard M., to Goodyear Tire & Rubber Company, The. Rubber vulcanization system with triazine compounds. 4,873,291, Cl. 525-348.000.

Coldren, Larry A.; Scott, Jeffery W.; and Yan, Ran H., to University of California, The Regents of the. Surface-emitting lasers with periodic gain and a parallel driven nipi structure. 4,873,696, Cl. 372-96.000.

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Colgate-Palmolive Company: *See*—
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Ramachandran, Pallassana N.; Grand, Paul S.; and Bauman, Robert A., 4,873,001, Cl. 252-8.800.

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Compton, James B.: *See*—
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Connectron, Inc.: *See*—
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Connor, Bonnie G.: *See*—
Asquith, Janet L.; and Connor, Bonnie G., 4,872,414, Cl. 116-210.000.

Connor, Gary L. Microwave popcorn popper. 4,873,406, Cl. 219-10.55E.

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Cooke, D. Wayne; and Jahan, Muhammad S., to United States of America, Energy. Detection of surface impurity phases in high $T_C$superconductors using thermally stimulated luminescence. 4,873,444, Cl. 250-337.000.

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Coon, Dennis C.: *See*—
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Coons, Gex B. Pressurizable game ball. 4,872,678, Cl. 273-61.00R.

Cooper, Gershon, to Alliance Research Corporation. Universally adjustable mounting device. 4,872,630, Cl. 248-278.000.

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Marach, David R., 4,872,262, Cl. 29-884.000.
Shaw, Richard E.; and Wolverton, Steven R., 4,872,481, Cl. 137-543.170.

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Corley, Larry S., to Shell Oil Company. Stabilized flame-retardant epoxy resin composition from a brominated epoxy resin and a vinyl monomer diluent. 4,873,309, Cl. 528-102.000.

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Corsi, Vincent R.; and Citrone, Gaetano W. Wheeled chair restraint. 4,872,534, Cl. 188-32.000.

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Cothran, Michael W.; and Nelson, III: Alvin T. Adjustable anchor bracket for non-invasive attachment to masonry wall. 4,872,629, Cl. 248-231.200.

Counsell, Raymond E.; Longino, Marc A.; Weichert, Jamey P.; and Schwendner, Susan P., to University of Michigan, The. Polyiodinated triglyceride analogs as radiologic agents. 4,873,075, Cl. 424-1.100.

Counts, Richard; and Pritchett, Rob, to Prescolite, Inc. On-off switch system for a pair of conductors. 4,873,403, Cl. 200-330.000.

Coury, Arthur J.; Hobot, Christopher M.; and Carlson, Kurt, to Medtronic, Inc. Biostable, segmented aliphatic polyurethanes and process therefor. 4,873,308, Cl. 528-75.000.

Coussediere, Daniel; Gigliotti, Giuseppe; and Moguilewsky, Martine, to Uclaf, Roussel. Antiandrogenic 4-hydroxymethyl-2-imidazolidinediones. 4,873,256, Cl. 514-391.000.

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Crawford, Frances G.; Shively, John E.; Todd, Charles W.; and Yang, Y. H. Joy, to Beckman Research Institute of City of Hope. Specific hybridoma cell line and monocolonal antibodies produced from such specific hybridoma cell line and method of using such monoclonal antibodies to detect carcinoembryonic antigens. 4,873,313, Cl. 530-387.000.
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Crippin, Albert B. Power chainsaw-ice auger conversion apparatus. 4,872,518, Cl. 175-18.000.
Critchlow, Dale L.; DeBrosse, John K.; Mohler, Rick L.; Noble, Wendell P., Jr.; and Parries, Paul C., to International Business Machines Corporation. Method for providing silicide bridge contact between silicon regions separated by a thin dielectric. 4,873,205, Cl. 437-200.000.
Critton, Thomas J.; Johnson, Donald S.; Pukalo, Walter P.; and Yorio, Ralph, to Vibratech, Inc. Torsional vibration damper having a roll spun housing and other improvements. 4,872,369, Cl. 74-574.000.
Cros, Patrick; and Pipon, Robert, to Rhone-Poulenc Specialites Chimiques. Acid/heat modified polysaccharide biopolymers. 4,873,323, Cl. 536-114.000.
Crossley, Roger, to John Wyeth & Brother Limited. 2,3-dihydrothiazolo- and thiazino- benzimidazoles as atni-hyper secretion agents. 4,873,237, Cl. 514-222.800.
Crotts, Lonnie; and Meadows, Thomas W., to Bivens Winchester Corporation. Vehicle treatment apparatus. 4,872,238, Cl. 15-302.000.
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Dakin, James T.; and El-Hamamsy, Sayed A., to General Electric Company. Electrodeless panel discharge lamp liquid crystal display. 4,872,741, Cl. 350-345.000.
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Dan, Takuya: *See*—
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Danigel, Harald; and Schatzmann, Hans-Rudolf, to Ciba-Geigy Corporation. Process cell with temperature compensation. 4,872,753, Cl. 356-246.000.
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Dausman, Jerome; and Avendt, Raymond J., to Bio Gro Systems, Inc. Apparatus and process for forming uniform, pelletizable sludge product. 4,872,998, Cl. 210-710.000.
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Davis, Cecil J.; Abernathy, Joseph V.; Matthews, Robert T.; Hildenbrand, Randall C.; Simpson, Bruce; Jones, John I.; Loewenstein, Lee M.; and Bohlman, James G., to Texas Instruments Incorporated. Processing apparatus. 4,872,938, Cl. 156-345.000.
Davis, Charles B. Fire extinguishing appliance and appended supplementary appliances. 4,872,511, Cl. 169-12.000.
Davis, Evy P., to Dana Corporation. Nut assembly with rotatable sleeve for taking up backlash. 4,872,795, Cl. 411-433.000.
Davis, Gail F.; and Baker, Robert L., to Halliburton Company. Tank mounting apparatus. 4,872,794, Cl. 410-54.000.
Davis, Lois T.: *See*—
Stringfellow, William T.; Goldsmith, Charles D.; and Davis, Lois T., 4,872,986, Cl. 210-611.000.
Davis, Richard C. Medical lavage apparatus. 4,872,866, Cl. 604-227.000.
Davison, Alan: *See*—
Jones, Alun G.; Davison, Alan; Kronauge, James; and Abrams, Michael J., 4,872,561, Cl. 206-569.000.
Dawson, Bryan J.; and Hill, Leonard J. Croquet ball. 4,872,677, Cl. 273-58.00A.
Dayen, Leonid; and Raines, Charles D., to Horton Manufacturing Co., Inc. Brake. 4,872,535, Cl. 188-170.000.
Deal, Clifton R. Baseball pitching practice devices. 4,872,674, Cl. 273-26.00A.
Dean, Thomas E.; Henrich, William H.; Fischer, David M.; Stratton, Lawrence J.; and Pietsch, Herbert E., to Thomas Industries Inc. High frequency ballast for gaseous discharge lamps. 4,873,471, Cl. 315-308.000.
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Critchlow, Dale L.; DeBrosse, John K.; Mohler, Rick L.; Noble, Wendell P., Jr.; and Parries, Paul C., 4,873,205, Cl. 437-200.000.
deBruin, Frank G., to Grand Rapids Label Company. Label or ticket. 4,872,707, Cl. 283-102.000.

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de Figueiredo, Joe L.: *See*—
Flynn, Tom S.; and de Figueiredo, Joe L., 4,872,920, Cl. 134-21.000.

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Engel, Wolfhard; Eberlein, Wolfgang; Mihm, Gerhard; Trummlitz, Gunter; Mayer, Norbert; and De Jonge, Adriaan, 4,873,236, Cl. 514-220.000.

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Szilagyi, Imre; Dekany, Gyula; Frank, Judit; Horvath, Gabor; and Kulcsar, Gabor, 4,873,348, Cl. 549-271.000.

De Kruif, Jack, to Allied-Signal Inc. Integral deflection washer compressor wheel. 4,872,817, Cl. 417-407.000.

Deley, Serge; and Fourrey, Francois, to ECIA–Equipements Et Composants Pour L'Industrie Automobile. Fixing device for a covering, especially a covering of a seat. 4,872,724, Cl. 297-218.000.

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Talroy, Robert C.; Ward, Sarah G.; and Schmidt, Parbury P., 4,873,226, Cl. 514-46.000.

De Marco, Franco, to Ernst Grob AG. Method for fabricating a dished hollow body possessing a linear or helical inner toothing. 4,872,250, Cl. 29-159.200.

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Ausiello, Francesco P.; Ricco, Mario; and De Matthaeis, Sisto Luigi, 4,872,438, Cl. 123-514.000.

Demeter, Michael G.; Wichman, Paul E.; Endres, Linda S.; and Rohrer, Charles E., to Johnson Service Company. Personal environmental module. 4,872,397, Cl. 98-31.600.

Dennis, Willard A. Electric drag strip apparatus. 4,872,680, Cl. 273-86.00B.

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DePaul, Richard E., to Somerville Packaging Corporation. Carton and blank for packaging ice crean or the like. 4,872,609, Cl. 229-134.000.

De Peuter, Willem L. G.: *See*—
Kemper, Nicolaas R.; Bouwens, Henricus J. J.; Koster, Marinus P.; and De Peuter, Willem L. G., 4,872,362, Cl. 74-479.000.

Dereu, Norbert: *See*—
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De Rooij, Johannes F. M.; and Meakins, Stephen E., to Unilever Patent Holdings B.V. Process for preparing hydrogen chloride hydrolyzed protein. 4,873,108, Cl. 426-533.000.

Dervin, Richard T. Wind deflector shield for water heater compartment. 4,872,444, Cl. 126-361.000.

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Lorenz, Dieter, 4,873,433, Cl. 250-233.000.

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Puckette, Thomas A.; and Devon, Thomas J., 4,873,213, Cl. 502-161.000.

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de Yong, John L., to Commonwealth Scientific and Industrial Research Organization. Psychrometer. 4,872,340, Cl. 73-338.000.

DeYoung, Thomas W., to Dataproducts Corporation. Phase change ink jet apparatus. 4,873,539, Cl. 346-140.00R.

Deyrup, Edward J., to Du Pont de Nemours, E. I., and Company. Food tray. 4,873,137, Cl. 428-216.000.

Dhillon, Major S.; Hsieh, Shane; and Seeley, Douglas A., to Hoechst Celanese Corporation. Method of using developer-finisher compositions for lithographic plates. 4,873,174, Cl. 430-309.000.

Dickinson, Ben W. O.; Dickinson, Robert W.; Anderson, Randall R.; Dickinson, Eric W.; and Wilkes, Robert D., to Petrolphysics Operators. Oil well production system using a hollow tube liner. 4,872,509, Cl. 166-278.000.

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Dicks, Lynton W. R., to Shell Oil Company. Measuring wall erosion. 4,872,345, Cl. 73-597.000.

Dickson, Calvin M.; and Rushforth, Kevin C., to Evans & Sutherland Computer Corporation. Computer graphics pixel processing system. 4,873,515, Cl. 340-728.000.

Dictaphone Corporation: *See*—
Dulaff, Paul G.; and McGraw, C. Eugene, 4,873,592, Cl. 360-90.000.

Dieterlen, Paul E.: *See*—
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Dietrich, Klaus; Hauer, Hans; and Schreier, Klaus, to Siemens Aktiengesellschaft. Address administration unit of a multi-processor central control unit of a communications switching system. 4,873,521, Cl. 340-825.520.

Dietz, Andras: *See*—
Petocz, Lujza; Simonyi, Istvan; Beck, Ivan; Gigler, Gabor; Fekete, Marton; Kiszelly, Eniko ; Mandi, Attila; Gorgenyi, Frigyes; Dietz, Andras; Sumeg nee Zukovics, Katalin; and Jakfalvi, Elemer, 4,873,249, Cl. 514-275.000.

Dietz, Matthias: *See*—
Bantle, Manfred; Munz, Volker; Zackl, Bernd; Dietz, Matthias; and Armbrust, Eberhard, 4,872,372, Cl. 74-710.500.

DiFonzo, John C.: *See*—
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Tognoni, Keith I.; Fitzgerald, John; Welch, Glenn; and Yonkers, Paul, 4,873,578, Cl. 358-254.000.

Dimantoglou, Michael; and Kuhne, Helmut, to Akzo N.V. Biocompatible cellulose dialysis membrane with increased adsorption of beta-2-microglobulin. 4,872,983, Cl. 210-500.290.

Dimos, Duane: *See*—
Garg, Diwakar; Dyer, Paul N.; and Dimos, Duane, 4,873,152, Cl. 428-627.000.

Dinges, Ray. Method for application of wastewater to plants for improved wastewater treatment. 4,872,985, Cl. 210-602.000.

Dippel, Stephanie A. Golf putter. 4,872,684, Cl. 273-164.000.

Dirksing, Robert S.; Girardot, Richard M.; and Merz, Theodore P., to Procter & Gamble Company, The. Bistable expandable bottle. 4,873,100, Cl. 426-111.000.

di Salle, Enrico: *See*—
Villa, Vittoria; di Salle, Enrico; and Lombardi, Paolo, 4,873,233, Cl. 514-179.000.

Disco Abrasive Systems, Ltd.: *See*—
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Dismukes, Edward B.: *See*—
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Hawener, Juergen; Havemann, Kim; and Sivers, Rolf V., 4,872,624, Cl. 244-54.000.
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Brickl, Rolf; Schepky, Gottfried; Rupprecht, Eckhard; and Greischel, Andreas, 4,873,080, Cl. 424-80.000.
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Doi, Masayuki; Asahi, Naotatsu; Kojima, Yoshitaka; Kanamaru, Hisanobu; and Aoyama, Susumu, to Hitachi, Ltd. High water-resistant member, and valve gear using the same for use in internal combustion engine. 4,873,150, Cl. 428-627.000.

Dolan, Donald T.: *See*—
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Dollinger Corporation: *See*—
Lamprecht, Ned L.; and Hawley, Clyde W., 4,872,890, Cl. 55-323.000.
Dong, Dennis F.; Noonan, Edward B.; Rogers, Derek J.; Clifford, Arthur L.; Benesch, Katharina; and Loftfield, Richard E., to H-D Tech Inc. Electrochemical cell having dual purpose electrode. 4,872,957, Cl. 204-84.000.
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Dooley, Daniel J. Putting tutor. 4,872,687, Cl. 273-185.00R.
Doran, Brian A.; and Redkey, Robert H., to Redkey, Robert H. Golf club putter. 4,872,683, Cl. 273-164.000.
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Dorfman, Mitchell R., to Perkin-Elmer Corporation, The. Tungsten carbide powder and method of making for flame spraying. 4,872,904, Cl. 75-0.5BA.
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Chau, C. C.; Im, Jang-hi; Raspor, Otto C.; and Tung, Lu H., 4,873,037, Cl. 264-49.000.
Fuentes, Ricardo, Jr.; Meiske, Larry A.; and Marchand, Gary R., 4,873,300, Cl. 526-142.000.
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Henley, John P.; Pearson, Stanley R.; Peters, Bruce C.; and LaFitte, Larry L., 4,872,886, Cl. 48-197.00R.
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McIntyre, John M.; Anderson, Kenneth W.; Rao, Nancy A.; and Hickner, Richard A., 4,872,961, Cl. 204-181.700.
Stack, Eugene V., 4,872,709, Cl. 285-39.000.
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Doyen, Daniel; and Vriz, Tarcisio, to U.S. Philips Corporation. Ultrahigh-frequency oscillator having a dielectric resonator stable with respect to mechanical vibrations. 4,873,495, Cl. 331-68.000.
Dracket Company, The: *See*—
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Bennitt, Robert A.; and Anderson, Alan C., 4,872,395, Cl. 92-139.000.
Drits, Vladimir; and Tselesin, Naum, to Innovex, Inc. Magnetic treatment of ferromagnetic materials. 4,873,605, Cl. 361-143.000.
Drumm, Kevin R., to Nuraseal Co. Ltd. Mechanical seal with heat exchanger. 4,872,689, Cl. 277-9.500.
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Duffey, Donald; Hardee, Sellers; Smith, Wayne; Elliott, James; Gardner, Robert; and Suess, Claus. Method of manufacturing a tool. 4,872,500, Cl. 164-34.000.
Duggan, Mark E., to Merck & Co., Inc. Process for the preparation of 5'-oxa, 5'-thia, 5'-aza HMG-CoA reductase inhibitors. 4,873,345, Cl. 549-214.000.
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Dulaff, Paul G.; and McGraw, C. Eugene, to Dictaphone Corporation. Pinch roller drive engagement mechanism for a communications monitor and logger. 4,873,592, Cl. 360-90.000.
Dumas, William V.: *See*—
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Dunford, Joseph R., to Enviroseal Engineering Products Ltd. Seal cavity protector. 4,872,690, Cl. 277-24.000.
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Dunton, Harvey R.; and Rez, Donald H., to Standard Concrete Products, Inc. Apparatus and method to produce foam, and foamed concrete. 4,872,913, Cl. 106-88.000.
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Eaton, S. Sheffield, Jr., to Ramtron Corporation. Self restoring ferroelectric memory. 4,873,664, Cl. 365-145.000.
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Eckardt, Bernd, to Siemens Aktiengesellschaft. Method and apparatus for pressure relief of a nuclear power plant. 4,873,050, Cl. 376-283.000.
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Moser, Manfred; Itgenshorst, Dieter; and Kutz, Johannes, 4,872,325, Cl. 68-200.000.
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Ehrfeld, Wolfgang; Hagmann, Peter; Mohr, Jurgen; and Munchmeyer, Dietrich, to Kernforschungszentrum Karlsruhe GmbH. Microporous

membrane filter and method of producing same. 4,872,888, Cl. 55-16.000.
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Fjare, Krisati A., to Amoco Corporation. Process for production of p-acetoxybenzoic acid from p-acetoxyacetophenone. 4,873,361, Cl. 560-130.000.

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thereon, and improved metal-plated plastic articles made therefrom. 4,873,136, Cl. 428-209.000.

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Hosoi, Yuichi; and Takahaski, Kenji, 4,873,438, Cl. 250-327.200.
Ishiguro, Shoji; Hirano, Shigeo; Shishido, Tadao; and Miyake, Akio, 4,873,172, Cl. 430-264.000.
Iwase, Yoshiki; and Kobayashi, Yasuhito, 4,873,581, Cl. 358-310.000.
Kido, Keishiro; and Saito, Yoshio, 4,873,059, Cl. 422-100.000.
Kimura, Tsutomu; and Watanabe, Yukio, 4,873,441, Cl. 250-327.200.
Kubodera, Seiiti; and Nakamine, Takeshi, 4,873,220, Cl. 503-227.000.
Miyasaka, Nobuaki; and Suga, Shuzo, 4,873,181, Cl. 430-523.000.
Mori, Nobufumi; Katoh, Takayuki; Oikawa, Tetsuo; Harada, Yoshiyasu; and Miyahara, Junji, 4,873,440, Cl. 250-327.200.
Nakajima, Nobuyoshi, 4,873,437, Cl. 250-327.200.
Negishi, Kenji; Sasaki, Hidemi; and Fujishiro, Takeshi, 4,873,598, Cl. 360-106.000.
Okita, Tsutomu, 4,873,138, Cl. 428-336.000.
Ono, Shuji; and Yamamoto, Masafumi, 4,873,435, Cl. 250-235.000.
Sasaoka, Senzo; Yoshida, Tetsuo; and Inoue, Nobuaki, 4,873,173, Cl. 430-964.000.
Uesugi, Akio; Kakei, Tsutomu; and Minato, Shinichiro, 4,872,946, Cl. 156-637.000.
Yamana, Keiichi; Imai, Masaru; and Ohtsuka, Shuichi, 4,873,545, Cl. 355-256.000.
Yasunaga, Tadashi; and Yanai, Akio, 4,873,154, Cl. 428-694.000.

Fuji Xerox Co., Ltd.: *See*—
Karakida, Ken-ichi; and Yagi, Shigeru, 4,873,165, Cl. 430-66.000.

Fujii, Masaki: *See*—
Yamada, Yasuhiro; Imamura, Takeshi; Honda, Hidemasa; Fujii, Masaki; and Minohata, Masanori, 4,873,071, Cl. 423-448.000.

Fujii, Mituru: *See*—
Ogawa, Toshio; Fujii, Mituru; Asai, Tadamichi; Ikegami, Akira; Ohtsu, Hiroshi; and Ato, Kazuhiko, 4,873,022, Cl. 428-209.000.

Fujii, Susumi; Ishida, Hiromi; Morioka, Masataka; Saito, Akihiro; and van der Meer, Roelof, to General Electric Company. Polyphenylene ether/polyamide blends having mproved physical properties. 4,873,276, Cl. 524-153.000.

Fujii, Yasuo; and Hayashi, Masahiko, to Kubota, Ltd. Guide system for a working machine having a product identifying system. 4,873,644, Cl. 364-478.000.

Fujimoto, Masayuki; Tao, Muneo; and Uchida, Kuniaki, to Matsushita Electric Industrial Co., Ltd. Kerosene heater providing automatic wick repositioning after ignition. 4,872,831, Cl. 431-73.000.

Fujino, Hitoshi: *See*—
Kobayashi, Hiroo; Fujino, Hitoshi; Yagi, Tadashi; Adachi, Nobukazu; Hayakawa, Yasuyoshi; and Setoriyama, Takeshi, 4,873,548, Cl. 355-200.000.

Fujisawa, Norio; Sakamoto, Toshishige; Ito, Toshiyasu; and Shimada, Junichi, to Toyoda Gosei Co., Ltd. Cover for car lamps. 4,872,745, Cl. 350-357.000.

Fujisawa Pharmaceutical Co., Ltd.: *See*—
Hirayama, Shigemitsu; Akashi, Takamichi; Ikuta, Akio; Sasaki, Isao; and Fukuda, Hiroshi, 4,872,974, Cl. 210-90.000.

Fujisawa, Syuichi: *See*—
Kobayashi, Hirokazu; Miyamoto, Yukihiko; Takai, Masaoki; Fujisawa, Syuichi; and Miyazawa, Hiroshi, 4,873,684, Cl. 370-102.000.

Fujishiro, Takeshi: *See*—
Negishi, Kenji; Sasaki, Hidemi; and Fujishiro, Takeshi, 4,873,598, Cl. 360-106.000.

Fujita, Kazuhisa: *See*—
Sakurai, Kaoru; Murakami, Harunori; Mizukami, Hikaru; and Fujita, Kazuhisa, 4,873,532, Cl. 343-713.000.

Fujita, Kazuo. Electrically-operated folding stage system. 4,872,295, Cl. 52-7.000.

Fujita, Kohtaroh; Wachi, Toshio; and Ikeda, Yoshiaki, to Sakai Chemical Industry Co., Ltd. Method for preparation of antimony mercaptides. 4,873,351, Cl. 556-76.000.

Fujita, Takashi; Hihara, Toshio; Kogure, Yoshio; Sekioka, Riyouichi; and Nakamura, Noboru, to Mitsubishi Kasei Corporation. Mixtures of water-soluble red and yellow or blue reactive dyes and a method of dyeing cellulosic fibers using such dye mixtures. 4,872,881, Cl. 8-549.000.

Fujita, Zenzo; Morita, Hirokiyo; and Morishita, Sadao, to Kasai Kogyo Co., Ltd. Method for manufacturing automotive interior components. 4,873,045, Cl. 264-259.000.

Fujitsu Limited: *See*—
Asakawa, Kazuo, 4,872,803, Cl. 414-730.000.
Suzuki, Masafumi; and Shirai, Hidenobu, 4,872,964, Cl. 204-298.000.

Fujiwara, Nobuo, to Victor Company of Japan, Ltd. Audio amplifier. 4,873,493, Cl. 330-285.000.

Fujiwara, Nobuo: *See*—
Yoshioka, Nobuyuki; Fujiwara, Nobuo; and Watakabe, Yaichirou, 4,873,162, Cl. 430-5.000.

Fujiwara, Takayoshi: *See*—
Iida, Toshikatsu; Fujiwara, Takayoshi; and Sone, Yoshinori, 4,872,820, Cl. 418-220.000.

Fukahori, Naoyuki: *See*—
Terada, Hiromu; Fukahori, Naoyuki; and Sakunaga, Kenichi, 4,872,740, Cl. 350-96.260.

Fukahori, Toshio; Takashima, Hideyuki; and Morinaga, Hitoshi, to Hitachi Cable Limited. Multi-port fiberoptic rotary joint. 4,872,737, Cl. 350-96.200.

Fukke, Hajime, to Hitachi, Ltd. Magnetic recording medium. 4,873,129, Cl. 428-694.000.

Fukuda, Hiroshi: *See*—
Hirayama, Shigemitsu; Akashi, Takamichi; Ikuta, Akio; Sasaki, Isao; and Fukuda, Hiroshi, 4,872,974, Cl. 210-90.000.

Fukuda, Junichi: *See*—
Morota, Makie; and Fukuda, Junichi, 4,873,452, Cl. 307-10.100.

Fukuda, Minoru: *See*—
Kashima, Toshihiro; and Fukuda, Minoru, 4,873,131, Cl. 428-64.000.

Fukuda, Yoshio: *See*—
Katoh, Akira; Ida, Masatoshi; Yunoki, Yutaka; Harada, Hisayuki; Inoue, Manabu; and Fukuda, Yoshio, 4,873,580, Cl. 358-335.000.

Fukui, Akira: *See*—
Shibagaki, Kouichi; and Fukui, Akira, 4,873,723, Cl. 381-34.000.

Fukumoto, Youshuke: *See*—
Sato, Hiroshi; Ohashi, Toshijiro; Hamada, Toyohide; Umakoshi, Yukimori; Suzuki, Takamichi; Wada, Yuuji; Hara, Shigeo; and Fukumoto, Youshuke, 4,872,618, Cl. 242-4.00R.

Fukunaga, Yukio: *See*—
Akatsu, Yohsuke; Fukushima, Naoto; Fukunaga, Yukio; Hano, Sunao; and Satoh, Masaharu, 4,872,701, Cl. 280-703.000.

Fukura Electric Company, Ltd., The: *See*—
Onodera, Kagetoshi; Koizumi, Tatsuya; Kato, Toshiyuki; Sotani, Junji; Momo, Masauki; and Furuya, Shuichi, 4,873,127, Cl. 427-376.800.

Fukushima, Naoto: *See*—
Akatsu, Yohsuke; Fukushima, Naoto; Fukunaga, Yukio; Hano, Sunao; and Satoh, Masaharu, 4,872,701, Cl. 280-703.000.

Fukuura, Yukio: *See*—
Yoshikawa, Masato; Fukuura, Yukio; Akiyama, Setsuo; Nakamura, Makoto; Naito, Kazuo; and Honda, Toshio, 4,872,932, Cl. 156-151.000.

Fuller, Mark W.: *See*—
Robinson, Alan S.; and Fuller, Mark W., 4,872,611, Cl. 239-18.000.

Fuller, Robert T.; and Sanders, Robert J. Carpet sample holder. 4,872,580, Cl. 211-45.000.

Fulton, Steven J.; Spehrley, Charles W., Jr.; and Young, Lawrence R., to Spectra, Inc. Hot melt ink projection transparency. 4,873,134, Cl. 428-156.000.

Fumio, Kimura: *See*—
Asanae, Masumi; and Fumio, Kimura, 4,873,540, Cl. 346-160.100.

Funk, Larry: *See*—
Thompson, Raymon F.; and Funk, Larry, 4,872,638, Cl. 251-54.000.

Furlanetto, Enrico: *See*—
Marchesano, Carlo; Buriano, Franco; and Furlanetto, Enrico, 4,873,180, Cl. 430-491.000.

Fursich, Manfred: *See*—
Zahn, Wolfgang; Fursich, Manfred; Nitsch, Wilhelm; Rauh, Hans-Jurgen; and Treiber, Helmut, 4,873,546, Cl. 355-38.000.

Furuhata, Takashi; Owashi, Hitoaki; Ito, Takayasu; and Hamaguchi, Masakazu, to Hitachi, Ltd. Video signal and method therefor time axis altering circuit used in a video tape recorder for recording a broadband video signal. 4,873,582, Cl. 358-310.000.

Furuishi, Yoshiro: *See*—
Kazumoto, Yoshio; Suganami, Takuya; Furuishi, Yoshiro; and Kashiwamura, Kazuo, 4,872,313, Cl. 62-6.000.

Furutani, Kiyohiro; Mashiko, Koichiro; Arimoto, Kazutami; Matsumoto, Noriaki; and Matsuda, Yoshio, to Mitsubishi Denki Kabushiki Kaisha. Random access memory device operable in a normal mode and in a test mode. 4,873,669, Cl. 365-189.010.

Furuya, Masayuki: *See*—
Miura, Tohru; Nagata, Teruyuki; Okazaki, Koju; Furuya, Masayuki; and Nishida, Emiko, 4,873,374, Cl. 568-743.000.

Furuya, Shuichi: *See*—
Onodera, Kagetoshi; Koizumi, Tatsuya; Kato, Toshiyuki; Sotani, Junji; Momo, Masauki; and Furuya, Shuichi, 4,873,127, Cl. 427-376.800.

Fuse, Kazuo: *See*—
Ikebuchi, Iwao; Nakano, Mamoru; Fuse, Kazuo; and Ganze, Akira, 4,872,973, Cl. 209-144.000.

G-C Dental Industrial Corp.: *See*—
Nakazato, Ryoji, 4,873,269, Cl. 523-115.000.

G & H Corporation of Connecticut, Inc.: *See*—
Grabowiecki, Robert J., 4,872,610, Cl. 232-17.000.

G. LeBlanc Corporation: *See*—
Ramirez, Lawrence; and Whiteside, Walter, 4,872,389, Cl. 84-387.00R.

GAF Corporation: *See*—
Liu, Kou-Chang; and Taylor, Paul D., 4,873,336, Cl. 546-243.000.
O'Lenick, Anthony J., Jr.; and Fanelli, Joseph J., 4,873,003, Cl. 252-8.750.
O'Lenick, Anthony J., Jr.; and Fanelli, Joseph J., 4,873,294, Cl. 525-419.000.

Gajic, Branco: *See*—
Gajic, Branco R., 4,872,900, Cl. 71-23.000.

Gajic, Branco R., to Patentverwertungsgesellschaft burgerlichen Rechts; Dorndorf, Gotz; and Gajic, Branco. Bioregulator based on plant raw materials and method for producing same. 4,872,900, Cl. 71-23.000.

Gallucci, Robert R.; van der Meer, Roelof; and Avakian, Roger W., to General Electric Company. Modified polyphenylene ether-polyamide compositions and process. 4,873,286, Cl. 525-92.000.

Galumbeck, Michael H. Stiffening module for a mattress box spring and a box spring incorporating same. 4,872,227, Cl. 5-246.000.

Galvin, Irving H. Disc launching and catching apparatus. 4,872,688, Cl. 273-326.000.

Ganze, Akira: *See*—
Ikebuchi, Iwao; Nakano, Mamoru; Fuse, Kazuo; and Ganze, Akira, 4,872,973, Cl. 209-144.000.

Garbinski, Paul A.: *See*—
Antreasyan, Arsam; Garbinski, Paul A.; Mattera, Vincent D., Jr.; and Temkin, Henryk, 4,873,558, Cl. 357-23.200.

Gardner, Robert: *See*—
Duffey, Donald; Hardee, Sellers; Smith, Wayne; Elliott, James; Gardner, Robert; and Suess, Claus, 4,872,500, Cl. 164-34.000.

Gardner, Stanley D.; and Finnigan, Wilfred J., to Finnigan, Wilfred J. Chimney fire extinguisher. 4,872,513, Cl. 169-57.000.

Garg, Diwakar; Dyer, Paul N.; and Dimos, Duane, to Air Products and Chemicals, Inc. Heat treated chemically vapor deposited products. 4,873,152, Cl. 428-627.000.

Garman, Robert C.: *See*—
Barrall, Jeffery L.; and Garman, Robert C., 4,872,912, Cl. 106-85.000.

Garrish, Bryan F., to Baltimore Aircoil Company, Inc. Low silhouette cooling tower with trapezoidal fill and method of air flow therethrough. 4,873,028, Cl. 261-109.000.

Gasser, Ruedi: *See*—
Greutert, Albert; and Gasser, Ruedi, 4,872,266, Cl. 30-346.510.

Gaudin, Serge, to Gaudin, Serge; Clauzet, Henry; and Daures, Jean-Pierre. Glide board with rudder. 4,872,861, Cl. 441-79.000.

Gaukel, Gisela: *See*—
Haeussler, Klaus M.; Wittmann, Julius; Gaukel, Gisela; and Auracher, Franz, 4,873,697, Cl. 372-108.000.

Gay, Christian; and Lassiaz, Philippe, to Valeo. Clutch release bearing for an automobile vehicle and means for the installation thereof. 4,872,539, Cl. 192-98.000.

Gaylord, Norman G.: *See*—
Allan, John L.; Boettcher, Jeffery J.; Gaylord, Norman G.; and Katz, Leon, 4,873,273, Cl. 523-407.000.

Geadah, Youssef A.; and Lefebvre, Martin C., to Northern Telecom Limited. FIFO buffer controller. 4,873,667, Cl. 365-189.070.

Geadah, Youssef A.: *See*—
Lefebvre, Martin C.; Ciancibello, Carmine A.; and Geadah, Youssef A., 4,873,666, Cl. 365-189.070.

Gebrueder Loepfe AG: *See*—
De Coi, Beat; and Keller, Hans-Peter, 4,873,621, Cl. 364-150.000.

Gefard, Prevot: *See*—
Jean-Claude, Legrand; and Gefard, Prevot, 4,872,716, Cl. 292-336.300.

Geisinger, Penrod C., to Vaporless Manufacturing, Inc. Gas evacuation apparatus for underground liquid storage tanks and method. 4,872,490, Cl. 141-7.000.

Gemignani, Andre, to Societe d'Exploitation de Brevets Pour l'Industrie et la Marine Sebim. Pilot-control safety valve. 4,872,639, Cl. 251-61.400.

General Electric Company: *See*—
Anderson, Patricia P.; Sivavec, Timothy M.; and Takekoshi, Tohru, 4,873,367, Cl. 562-425.000.
Boutni, Omar M., 4,873,277, Cl. 524-166.000.
Castleberry, Donald E., 4,873,516, Cl. 340-784.000.
Cusano, Dominic A.; and Possin, George E., 4,873,708, Cl. 378-62.000.
Dakin, James T.; and El-Hamamsy, Sayed A., 4,872,741, Cl. 350-345.000.
Espiritu-Santo, Eugenio, 4,872,349, Cl. 73-727.000.
Foust, Donald F.; Lamby, Edward J.; Karas, Bradley R.; Dumas, William V.; and Jerabek, Elihu C., 4,873,136, Cl. 428-209.000.
Fujii, Susumi; Ishida, Hiromi; Morioka, Masataka; Saito, Akihiro; and van der Meer, Roelof, 4,873,276, Cl. 524-153.000.
Gallucci, Robert R.; van der Meer, Roelof; and Avakian, Roger W., 4,873,286, Cl. 525-92.000.
Giles, Harold F., Jr., 4,873,133, Cl. 428-107.000.
Hendley, David G.; and Litzinger, William A., 4,872,812, Cl. 416-190.000.
Holub, Fred F.; Abolins, Visvaldis; and Rock, John A., 4,873,287, Cl. 525-92.000.
Knapp, Malcolm H., 4,872,767, Cl. 384-99.000.
Nelson, Linda H., 4,873,278, Cl. 524-380.000.
Nelson, Linda H., 4,873,279, Cl. 524-384.000.
Smith, Pamela S.; and Smith, Peter H., deceased, 4,873,408, Cl. 219-10.55B.
Weiss, Herbert W., 4,873,478, Cl. 318-779.000.
Wilkinson, Stanley B., 4,873,602, Cl. 361-78.000.
Woods, Daniel C.; and Efferson, Kenneth R., 4,872,322, Cl. 62-51.100.
Yeager, Gary W.; and Schissel, David N., 4,873,371, Cl. 568-33.000.

General Motors Corporation: *See*—
Appleby, John M.; Bolsworth, James; and Wilson, Charles M., 4,872,366, Cl. 74-501.600.
Skinner, Timothy J.; Spurney, Joseph L.; and Ma, Weiming, 4,872,814, Cl. 417-222.000.
Genrich, Thad J., to Motorola, Inc. Phase accumulation continuous phase modulator. 4,873,500, Cl. 332-104.000.
Geodisplay Technology Limited Partnership: *See*—
Soults, Donald J.; and Daniels, Neil A., 4,873,513, Cl. 340-723.000.
Geophysical Engineering Company: *See*—
Assaf, Gad, 4,872,315, Cl. 62-94.000.
George, Louis J.; and Taylor, Lloyd D., to Polaroid Corporation. Image-receiving element for diffusion transfer photographic product. 4,873,171, Cl. 430-213.000.
Gerhard, Bruce; and Schulman, Bruce, to NEC Electronics Inc. Mass flow meter. 4,872,339, Cl. 73-204.140.
Gettliffe, Jessie: *See*—
Daniel, Vernon T.; Gettliffe, Jessie; and Lorenzo, Tina V., 4,872,416, Cl. 118-203.000.
Geurts, Herman J. J. M.: *See*—
Erkens, Leonardus J. H.; Algra, Gerben P.; Snijders, Jacobus M. H.; Geurts, Herman J. J. M.; and Pugin, Andre , 4,872,915, Cl. 106-433.000.
Geyer, Paul. Extrusion apparatus. 4,872,761, Cl. 366-79.000.
Giacobbe, Frederick, to American Air Liquide. Process for heat treating metals or metal alloys in a thermal plasma. 4,872,926, Cl. 148-13.100.
Gibbs & Hill, Inc.: *See*—
Nakhamkin, Michael, 4,872,307, Cl. 60-39.020.
Gibson, Peter J., to U.S. Philips Corp. Coplanar patch antenna. 4,873,529, Cl. 343-700.0MS.
Gibson, Robert R.: *See*—
Bailey, James B.; Gibson, Robert R.; Nunley, Alvin, III; and Utz, Q. Wayne, 4,873,676, Cl. 367-98.000.
Giersch, Dieter; Rickmann, Hans-Werner; and Wibbeling, Ulrich, to Hoesch Aktiengesellschaft. Removable tooth with adapter for digging excavators. 4,872,274, Cl. 37-64.000.
Gifford, David K., to Massachusetts Institute of Technology. Parallel processing system with processor array having memory system included in system memory. 4,873,626, Cl. 364-200.000.
Gigler, Gabor: *See*—
Petocz, Lujza; Simonyi, Istvan; Beck, Ivan; Gigler, Gabor; Fekete, Marton; Kiszelly, Eniko ; Mandi, Attila; Gorgenyi, Frigyes; Dietz, Andras; Sumeg nee Zukovics, Katalin; and Jakfalvi, Elemer, 4,873,249, Cl. 514-275.000.
Gigliotti, Giuseppe: *See*—
Coussediere, Daniel; Gigliotti, Giuseppe; and Moguilewsky, Martine, 4,873,256, Cl. 514-391.000.
Gilbert, James R.: *See*—
Grimmer, Derrick P.; Paulson, Kenneth R.; and Gilbert, James R., 4,873,201, Cl. 437-51.000.
Gilbert, Wendell L.: *See*—
Rabe, William T.; and Gilbert, Wendell L., 4,872,393, Cl. 91-375.00A.
Giles, Harold F., Jr., to General Electric Company. Fiber reinforced stampsable thermoplastic sheet. 4,873,133, Cl. 428-107.000.
Gill, G. Herbert. Remote release saddle post clamp. 4,872,696, Cl. 280-281.100.
Gillsdpy, Kenton P.; and Kelly, David L., to Burke Company, The. Bracing for tilt-up wall panel. 4,872,634, Cl. 248-354.300.
Girard, Bernard, to Thomson-CSF. Device for energizing a non-eccentric in the wide side of a waveguide, and a slotted antenna comprising such a device. 4,873,528, Cl. 343-770.000.
Girardot, Richard M.: *See*—
Dirksing, Robert S.; Girardot, Richard M.; and Merz, Theodore P., 4,873,100, Cl. 426-111.000.
Girlock, Harry: *See*—
Middleton, Philip N.; Green, Glen R.; and Girlock, Harry, 4,872,474, Cl. 137-493.800.
GIW Industries, Inc.: *See*—
Addie, Graeme R.; and Visintainer, Robert J., 4,872,809, Cl. 415-206.000.
Glagovsky, Boris A.: *See*—
Grebenkin, Anatoly F.; Glagovsky, Boris A.; Moskovenko, Igor B.; and Lasukova, Ijudmila P., 4,872,344, Cl. 73-579.000.
Glaser, Thomas: *See*—
Junge, Bodo; Richter, Bernd; Glaser, Thomas; Traber, Jorg; and Allen, George S., 4,873,262, Cl. 514-510.000.
Glasstech, Inc.: *See*—
McMaster, Harold A., 4,872,925, Cl. 136-244.000.
Glaverbel: *See*—
Toussaint, Francois; and Goelff, Pierre, 4,873,146, Cl. 428-428.000.
Globus, Alfred R. Iodophor. 4,873,354, Cl. 558-51.000.
Glyco-Metall-Werke, Daelen & Loos GmbH: *See*—
Roemer, Erich; Kuhn, Matthaus; and Maurer, Leonhard, 4,872,248, Cl. 29-149.5DP.
Gnyra, Bohdan, to Alcan International Limited. Insulating lightweight refractory materials. 4,873,209, Cl. 501-95.000.
Godfrey, Thomas E., to Milliken Research Corporation. Calendering process for polyester fabric. 4,872,276, Cl. 38-101.000.
Goegelman, Robert T.; and Ondeyka, John G. Derivatives of paraherquamide isolated from a fermentation broth active as antiparasitic agents. 4,873,247, Cl. 514-257.000.
Goelff, Pierre: *See*—
Toussaint, Francois; and Goelff, Pierre, 4,873,146, Cl. 428-428.000.
Golay, Marcel, to Perkin-Elmer Corporation, The. Chromatography column. 4,872,979, Cl. 210-198.200.
Gold Medal Products Co.: *See*—
Weiss, Ronald R., 4,872,821, Cl. 425-9.000.
Goldberg, Harris A.; and Williams, Clyde C., to Hoechst Celanese Corp. Fuses having suppressed voltage transients. 4,873,604, Cl. 361-104.000.
Goldfarb, William C.: *See*—
Kamieniecki, Emil; Reiss, Leszek; and Goldfarb, William C., 4,873,436, Cl. 250-315.300.
Goldsmith, Charles D.: *See*—
Stringfellow, William T.; Goldsmith, Charles D.; and Davis, Lois T., 4,872,986, Cl. 210-611.000.
Golz, Jack L.: *See*—
Meisenburg, Gary L.; Bertram, Francis E.; and Golz, Jack L., 4,872,531, Cl. 184-6.400.
Gooch, John P.: *See*—
Altman, Ralph F.; Gooch, John P.; Dismukes, Edward B.; and Landham, Edward C., Jr., 4,872,887, Cl. 55-5.000.
Good, William R.; Mikes, John; and Sikora, Joseph, to Ciba-Geigy Corporation. Hydrogels with increased organic solvent soluble active agent loading capacity, their preparation and the use thereof. 4,873,086, Cl. 424-409.000.
Goodman, Matthew S.: *See*—
Arthurs, Edward; Goodman, Matthew S.; Kobrinski, Haim; and Vecchi, Mario P., 4,873,681, Cl. 370-3.000.
Goodyear Tire & Rubber Company, The: *See*—
Allen, Terry F.; and Schisler, Robert C., 4,873,290, Cl. 525-337.000.
Cohen, Martin P.; and D'Sidocky, Richard M., 4,873,291, Cl. 525-348.000.
Goplen, Gary D.; and Iles, Lawrence F., to Nelson Industries Inc. Muffler construction. 4,872,528, Cl. 181-228.000.
Gordon, Richard W. Oil well pump leakage accumulator. 4,872,508, Cl. 166-84.000.
Gorgenyi, Frigyes: *See*—
Petocz, Lujza; Simonyi, Istvan; Beck, Ivan; Gigler, Gabor; Fekete, Marton; Kiszelly, Eniko ; Mandi, Attila; Gorgenyi, Frigyes; Dietz, Andras; Sumeg nee Zukovics, Katalin; and Jakfalvi, Elemer, 4,873,249, Cl. 514-275.000.
Gorscak, Sharon L.: *See*—
Johnson, Trevor A.; and Gorscak, Sharon L., 4,873,415, Cl. 219-121.640.
Gorski, Robert A.; Eiseman, Bernhardt J., Jr.; and Kvalnes, Donovan E., to Du Pont de Nemours, E. I., and Company. Azeotrope or azeotrope-like composition of trichlorotrifluoroethane and dichlorodifluoroethane. 4,873,021, Cl. 252-364.000.
Gorton, Lanny A.; and Pelmulder, John P., to Pacesetter Infusion, Ltd. Disposable cassette for a medication infusion system. 4,872,813, Cl. 417-63.000.
Gosswein, Claus F.: *See*—
Kopsch, Reiner; Gosswein, Claus F.; Lutz, Henning; Ball, Michael; and Hubert, Peter, 4,872,987, Cl. 210-635.000.
Gostin, Gary B.: *See*—
Harris, Michael C.; Chastain, David M.; and Gostin, Gary B., 4,873,629, Cl. 364-200.000.
Goto, Kiyokazu: *See*—
Ishizaka, Yoshirou; Naganuma, Hiroshi; Sato, Kenji; Kishi, Yuji; Ishida, Yoshihisa; and Goto, Kiyokazu, 4,872,320, Cl. 62-255.000.
Goto, Takakiyo: *See*—
Tsubakimoto, Tsuneo; Ito, Hayami; Tatsumi, Shuhei; Kajibata, Yoshihiro; Takao, Shoichi; Goto, Takakiyo; Nakaishi, Akio; Rakutani, Kenji; Tamura, Toshio; and Kobayashi, Hiroya, 4,872,885, Cl. 44-51.000.
Gotoh, Yoshihiko: *See*—
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Gould, John H., to United States of America, Health. Quick color test to detect lead release from glazed ceramic and enameled metal ware. 4,873,197, Cl. 436-77.000.
Gouldy, Thomas E., to GTE Products Corporation. Electrical component and method of mounting same. 4,872,937, Cl. 156-313.000.
Grabbe, Dimitry G., to AMP Incorporated. Semiconductor chip carrier system. 4,873,615, Cl. 361-395.000.
Grabley, Susanne: *See*—
Hammann, Peter; Grabley, Susanne; Raether, Wolfgang; Ciommer, Bernd; Kluge, Heinz; and Sachse, Burkhard, 4,873,347, Cl. 549-267.000.
Grabowiecki, Robert J., to G & H Corporation of Connecticut, Inc. Display mailbox with interchangeable inserts. 4,872,610, Cl. 232-17.000.
Graf, Eric: *See*—
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Grald, Eric W.; and MacArthur, J. Ward, to Honeywell Inc. Method for operating variable speed heat pumps and air conditioners. 4,873,649, Cl. 364-505.000.
Grand, Paul S.: *See*—
Ramachandran, Pallassana N.; Grand, Paul S.; and Bauman, Robert A., 4,873,001, Cl. 252-8.800.
Grand Rapids Label Company: *See*—
deBruin, Frank G., 4,872,707, Cl. 283-102.000.
Grant, Cathy: *See*—
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Grass Valley Group, Inc., The: *See—*
Jackson, Richard A.; Abt, John; and Barnett, Ronnie D., 4,873,568, Cl. 358-22.000.

Gray, James P.: *See—*
Baratz, Alan E.; Clarke, Kathryn E.; Pollard, Melinda R.; Pozefsky, Diane P.; Rafalow, Lee M.; Siddall, William E.; and Gray, James P., 4,873,517, Cl. 340-825.030.

Gray, Kenneth E., to United States of America, Energy. Superconducting transmission line particle detector. 4,873,482, Cl. 324-71.400.

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Schweighardt, Frank K.; Bailey, Webb I.; Lileck, John T.; Graybill, John K.; and Lutz, Eugene G., 4,873,315, Cl. 570-130.000.

Grayling Industries, Inc.: *See—*
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Grebe, Robert K.; Lucius, John E.; and Szczesny, David S., to AMP Incorporated. Component-carrying adapter for chip carrier socket. 4,872,844, Cl. 439-69.000.

Grebenkin, Anatoly F.; Glagovsky, Boris A.; Moskovenko, Igor B.; and Lasukova, Ijudmila P., to Vsesojuzny Nauchno-Issledovatelsky I Proektny Institut Aljuminievoi, Magnievoi I Elektrodnoi. Method of nondestructive quality control of carbon articles. 4,872,344, Cl. 73-579.000.

Greco, Robert L., Jr., to Xerox Corporation. Electrostatographic machine with withdrawable copy paper module. 4,873,554, Cl. 355-309.000.

Greco, William J., Jr., to Sybron Chemicals, Inc. Electrically insulating fluids. 4,873,611, Cl. 361-315.000.

Green, Glen R.: *See—*
Middleton, Philip N.; Green, Glen R.; and Girlock, Harry, 4,872,474, Cl. 137-493.800.

Green, Kenneth L. Air and fuel mixing devices for internal combustion engines. 4,872,440, Cl. 123-590.000.

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Greene, Jonathan W.: *See—*
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Greene, Ralph J.: *See—*
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Greenhouse, Robert: *See—*
Muchowski, Joseph M.; and Greenhouse, Robert, 4,873,340, Cl. 548-453.000.

Greenspan, Michael D.: *See—*
Alberts, Alfred W.; and Greenspan, Michael D., 4,873,260, Cl. 514-449.000.

Greenwood, Alden T. Balanced buoyancy control diving gear. 4,872,783, Cl. 405-186.000.

Greeves, Godfrey; and Fry, Robert J., to Lucas Industries Public Limited Company. Fuel injection nozzle. 4,872,614, Cl. 239-533.900.

Grein-Wiegand, Aleide, to Varnel Chemical Business S.A. Process for the production of extendable thermographic plates. 4,873,113, Cl. 427-2.000.

Greischel, Andreas: *See—*
Brickl, Rolf; Schepky, Gottfried; Rupprecht, Eckhard; and Greischel, Andreas, 4,873,080, Cl. 424-80.000.

Grendahl, Dennis T.: *See—*
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Tiffany, John S., 4,872,878, Cl. 623-6.000.

Greutert, Albert; and Gasser, Ruedi, to Maxs AG. Plastic frame with embedded shearing foil. 4,872,266, Cl. 30-346.510.

Grierson, Jeffrey G.; Wilson, David A.; and Crump, Druce K., to Dow Chemical Company, The. Use of aminophosphonic acids to inhibit scale formation and corrosion caused by manganese in water systems. 4,872,996, Cl. 210-700.000.

Gries, Josef: *See—*
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Griffith, Ronald C.: *See—*
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Griffiths, John M.; Forsgren, Lyle M.; Newman, Neil A.; and Beck, Wayne T., to Brunswick Corporation. Lift and latch apparatus for an outboard motor. 4,872,859, Cl. 440-53.000.

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Grigo, Ulrich: *See—*
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Grimes, Fred D.; and Grimes, Linda D. Bathtub apparatus. 4,872,224, Cl. 4-544.000.

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Grimmer, Derrick P.; Paulson, Kenneth R.; and Gilbert, James R., to Minnesota Mining and Manufacturing Company. Method for fabricating an interconnected array of semiconductor devices. 4,873,201, Cl. 437-51.000.

Gross, Akiva T.: *See—*
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Grosskopf, Rudolf E., to Carl-Zeiss-Stiftung. Microscope system for providing three-dimensional resolution. 4,873,653, Cl. 364-525.000.

Grosso, John A.: *See—*
Petrillo, Edward W., Jr.; Karanewsky, Donald S.; Thottathil, John K.; Heikes, James E.; and Grosso, John A., 4,873,356, Cl. 558-180.000.

Grove, Clinton E.; and Grove, Robert D. Apparatus and method for adjusting camber and toe. 4,872,699, Cl. 280-661.000.

Grove, James E. Releasable extraoral orthodontic appliance. 4,872,836, Cl. 433-5.000.

Grove, Robert D.: *See—*
Grove, Clinton E.; and Grove, Robert D., 4,872,699, Cl. 280-661.000.

Grunden, Michael T.: *See—*
Mierzwinski, Eugene P.; Grunden, Michael T.; and Youtz, Stephen E., 4,872,828, Cl. 431-16.000.

Gryson, Dirk; and Shaw, Henry, to Picanol N.V. Device for determining the position of a warp thread break. 4,872,488, Cl. 139-353.000.

GTE Products Corporation: *See—*
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Hsieh, Martin Y., 4,873,210, Cl. 501-98.000.
Johnson, Robert R.; and Orbanic, Robert S., 4,872,260, Cl. 29-827.000.
Jones, Gerald M.; and Nemcovsky, Rhonda L., 4,872,259, Cl. 29-764.000.
Kemp, Preston B., Jr.; and Holland, Robert J., Sr., 4,873,148, Cl. 428-570.000.

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Guity-Mehr, Hossein F., to Texim International. Wall electrical cover plate. 4,873,396, Cl. 174-66.000.

Gunn, Bruce P.: *See—*
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Gunn, Dennis R. String anchoring and trimming device. 4,872,388, Cl. 84-297.00R.

Gunze Limited: *See—*
Niwa, Katuhiro; Abe, Nobuyasu; Kajikiyo, Katuji; Suzuoki, Tsutomu; Tabuti, Katumi; and Arii, Yoshifumi, 4,872,383, Cl. 83-175.000.

Guo, Ta-Pen R.: *See—*
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Gurevich, Leon, to Cooper Industries, Inc. Metallo-organic film fractional ampere fuses and method of making. 4,873,506, Cl. 337-290.000.

Gustafson, Richard J., to Cummins Engine Company, Inc. Position controller for a rotatable shaft. 4,872,427, Cl. 123-90.160.

Gustavsen, Willard. Impact blade tool. 4,872,231, Cl. 7-103.000.

Gutov, Sergei K.; Plesser, Dmitry A.; and Radutsky, Grigory A. Unit goods storage. 4,872,800, Cl. 414-278.000.

Guttinger, Peter: *See—*
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H. J. Langen & Sons Limited: *See—*
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H. Lundbeck A/S: *See—*
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Habata, Hidetsugu: *See—*
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Haeussler, Klaus M.; Wittmann, Julius; Gaukel, Gisela; and Auracher, Franz, to Siemens Aktiengesellschaft. Narrowband laser transmitter having an external resonator from which the output power can be taken. 4,873,697, Cl. 372-108.000.

Hagelstein, Peter L.; and Eugster, Cristopher C., to Massachusetts Institute of Technology. X-ray detector. 4,873,439, Cl. 250-327.200.

Hagen, Gary P.; and Nemo, Thomas E., to Amoco Corporation. Selective production of 2,6-diethylnaphthalene. 4,873,386, Cl. 585-471.000.

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Hagiri, Masaharu: *See—*
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Hagmann, Peter: *See*—
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Hahn, Charles R.; and Shapiro, Warren B., to Clairol Incorporated. Hair coloring composition and its method of use. 4,873,079, Cl. 424-70.000.

Hahn, Gerald D.: *See*—
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Hahn, Granville J.: *See*—
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Hahn, Klaus: *See*—
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Hahnke, Manfred; and Kuhn, Reinhard, to Hoechst Aktiengesellschaft. Dyeing formulations of mixtures of red disperse dyes for the washfast dyeing of polyester fibers or mixtures thereof with cellulose fibers: benzo-di-furanone and azo dyes. 4,872,882, Cl. 8-638.000.

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Hakeem, Terri A. Child seat. 4,872,725, Cl. 297-250.000.

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Hallmark, Richard K.; Skowronski, Michael J.; and Stephens, William D., to Sloss Industries Corporation. Digestion products of polyalkylene terephthalate polymers and polycarboxylic acid-containing polyols and polymeric foams obtained therefrom. 4,873,268, Cl. 521-48.500.

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Hammett, Roy; Hutcheson, Jerry D.; and Avedon, Raymond B. Mechanically pressurized aerosol dispenser. 4,872,595, Cl. 222-209.000.

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Han, Bong H., to Samsung Electronics Co., Ltd. Speaker system. 4,872,527, Cl. 181-160.000.

Hanada, Ryoji; Morikawa, Tuneo; and Kabe, Kazuyuki, to Yokohama Rubber Co., Ltd., The. Pneumatic radial tire and rim combination for passenger car. 4,872,497, Cl. 152-541.000.

Hanafusa, Hisao. Beverage container with dual dispensing tabs. 4,872,597, Cl. 222-541.000.

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Hanson, Richard A.; Peters, Rex B.; Norling, Brian L.; and Urbach, Edward A., to Sundstrand Data Control, Inc. Translational accelerometer and accelerometer assembly method. 4,872,342, Cl. 73-517.00R.

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Harada, Tsutomu; and Okamura, Yasushi, to Matsushita Electric Industrial Co., Ltd. Magnetic disk drive apparatus. 4,873,596, Cl. 360-99.110.

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Hargreaves, Rodney B.; McLoughlin, Bernard J.; and Mills, Stuart D., to Imperial Chemical Industries plc. 1,4-Dihydropyridines substituted by 3-aryloxy-2-hydroxypropyl amino moiety in the 4-phenyl group. 4,873,254, Cl. 514-356.000.

Harned, Timothy J., to Eastern Air Devices, Inc. Stepping motor with low detent torque. 4,873,462, Cl. 310-49.00R.

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Harris Corporation: *See*—
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Harris, Michael C.; Chastain, David M.; and Gostin, Gary B., to Convex Computer Corporation. Instruction processing unit for computer. 4,873,629, Cl. 364-200.000.

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Haruvy, Yair; Katz, Moshe; and Horowitz, Abraham A., to State of Israel, Atomic Energy Commission, Soreo Nuclear Research Center, The. Protective composite materials, their production and articles of protective clothing made therefrom. 4,872,220, Cl. 2-243.00A.

Hasegawa, Junichi; and Takahashi, Hideharu, to Sanshin Kogyo Kabushiki Kaisha. Outboard jet propulsion device. 4,872,858, Cl. 440-38.000.

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Hatanaka, Ryousuke, to Nihon Technical Kabushiki Kaisha. Head plate operating mechanism for cassette tape player. 4,873,597, Cl. 360-105.000.

Hattori, Shuzo; Tagawa, Takashi; and Asano, Motomu, to Meitec Corporation; and Hattori, Shuzo. X-ray generator with grooved rotary anode. 4,873,709, Cl. 378-142.000.

Hattori, Tsuyoshi; Tanaka, Masanao; and Matsuzaka, Syoji, to Konica Corporation. Camera equipped with a television set. 4,873,576, Cl. 358-224.000.

Hauer, Hans: *See—*
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Hawener, Juergen; Havemann, Kim; and Sivers, Rolf V., to Dr. Ing. h.c.f. Porsche AG. Drive arrangement for a vehicle having a propeller. 4,872,624, Cl. 244-54.000.

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Hayashi, Yukichi, to Kabushiki Kaisha Nippon Coinco. Vending machine having slave dispensing units. 4,872,541, Cl. 194-217.000.

Hayashida, John P.; and Bowman, Roger P., to Canada, Her Majesty the Queen in right of. Portable emergency shelter. 4,872,470, Cl. 135-97.000.

Hayes Microcomputer Products, Inc.: *See—*
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Hayes, William K.: *See—*
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Hebert, Roland J. Crayfish harvester boat apparatus. 4,872,413, Cl. 114-270.000.

Hecht, Hans; and Kuhnt, Winfried, to Robert Bosch GmbH. Circuit arrangement for generating an output signal that is nonlinearly dependent on the temperature. 4,873,490, Cl. 328-3.000.

Heckmann, Klaus; Manecke, Georg; Pfannenmuller, Beate; Ring, Klaus; and Ringsdorf, Helmut, to Klaus Heckmann. Process for the production of hyperfiltration membranes. 4,873,033, Cl. 264-41.000.

Heddebaut, Marc; Mainardi, Pierre; Degauque, Pierre; and Duhot, Denis, to Societe Anonyme dite : Alsthom. Identification transponder for use when a vehicle passes a given point. 4,873,531, Cl. 343-711.000.

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Kusch, Hans-Jurgen, 4,872,406, Cl. 101-148.000.

Heider, Kenneth J.: *See—*
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Heikes, James E.: *See—*
Petrillo, Edward W., Jr.; Karanewsky, Donald S.; Thottathil, John K.; Heikes, James E.; and Grosso, John A., 4,873,356, Cl. 558-180.000.

Helland, Ingolv. Clamping means for attaching the ends of a conveyor coil spring to a journal pin. 4,872,547, Cl. 198-659.000.

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Hellstrom, Karl E.: *See—*
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Hemphill, D. Gary: *See—*
Jensen, Richard E.; Nichols, Donald H.; and Hemphill, D. Gary, 4,873,193, Cl. 436-176.000.

Hendley, David G.; and Litzinger, William A., to General Electric Company. Turbine blade plateform sealing and vibration damping apparatus. 4,872,812, Cl. 416-190.000.

Henley, John P.; Pearson, Stanley R.; Peters, Bruce C.; and LaFitte, Larry L., to Dow Chemical Company, The. Two-stage coal gasification process. 4,872,886, Cl. 48-197.00R.

Hennessy Industries, Inc.: *See—*
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Henry, Harry M. Adjustable resistance exerciser. 4,872,669, Cl. 272-132.000.

Hensler, Paul L., to FMC Corporation. Process for manufacturing tetrasodium pyrophosphate. 4,873,068, Cl. 423-315.000.

Hepp, Vincent R., to Amoco Corporation. Interpretation of conical structures from dipmeter surveys. 4,873,636, Cl. 364-422.000.

Herault, Didier: *See—*
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Herbst, Richard L.: *See—*
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Herbst, Robert J.; and Renk, Russell R., to Cleanup & Recovery Corp. (CURE). Electrolytic treatment of liquids. 4,872,959, Cl. 204-109.000.

Hercher, Michael. Non-contact lateral displacement sensor and extensometer system. 4,872,751, Cl. 356-35.500.

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Davidson, Wayne A.; Ernst, John P.; Herkes, Marybeth; Kuppuswami, Ram; Satalich, Timothy A.; and Stanaway, John J., Jr., 4,873,717, Cl. 379-157.000.

Hernandez, Henry R.: *See—*
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Herrmann, Gerhard: *See—*
Brandenstein, Manfred; Haas, Roland; Friedrich, Wolfgang; and Herrmann, Gerhard, 4,872,768, Cl. 384-223.000.

Hertleif, Hans-Peter: *See—*
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Hertz, Dominique; and Couturier, Jean-Michel, to Framatome; and Compagnie Generale Des Matieres Nucleaires. Stainless steel tubular element with improved wear resistance. 4,873,117, Cl. 427-37.000.

Hesu, Victor C., to Hyman Products, Inc. Simulated ball used in sports incorporating an electronic component. 4,872,854, Cl. 439-577.000.

Hetzel, Joseph R.; and Virgins, Kenneth L., to Patio Enclosures, Inc. Header assembly. 4,872,297, Cl. 52-92.000.

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Crandall, Douglas; Cavanna, Vicente; Shankar, Pradip; and Nordby, Rasmus, 4,873,703, Cl. 375-118.000.
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Wong, Siu-Weng S.; Chen, Devereaux C.; and Chiu, Kuang-Yi, 4,873,204, Cl. 437-200.000.

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Hickey, John. System for controlling the flow of a fluid medium relative to an object. 4,872,484, Cl. 137-561.00R.

Hickner, Richard A.: *See—*
McIntyre, John M.; Anderson, Kenneth W.; Rao, Nancy A.; and Hickner, Richard A., 4,872,961, Cl. 204-181.700.

Hicks, Darrell D.: *See—*
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Higashiyama, Yasuhiko: *See—*
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Hightower, Edwin C., to FMC Corporation. Heat exchanger for mobile aircraft deicing machine and method of use. 4,872,501, Cl. 165-1.000.

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Higuchi, Noboru; Matsui, Keizo; Kobayashi, Chuzo; and Yamaguchi, Shigeru, to Fuji Photo Film Co., Ltd. Method of and apparatus for measuring liquid. 4,872,763, Cl. 366-160.000.

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Hill, Barry R., to Pilkington Brothers plc. Dual path interferometer with varying difference in path length. 4,872,756, Cl. 356-361.000.
Hill, Edward C.: *See*—
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Hill, Leonard J.: *See*—
Dawson, Bryan J.; and Hill, Leonard J., 4,872,677, Cl. 273-58.00A.
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Hinchcliffe, Dennis, to Molins PLC. Conveyor system for rod-like articles. 4,872,543, Cl. 198-347.000.
Hindermann, Erich A. Screw conveyor device. 4,872,546, Cl. 198-659.000.
Hioki, Yoshihiro: *See*—
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Hirai, Yutaka: *See*—
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Hirayama, Shigemitsu; Akashi, Takamichi; Ikuta, Akio; Sasaki, Isao; and Fukuda, Hiroshi, to Fujisawa Pharmaceutical Co., Ltd. Apparatus for testing membrane filters, and for sterilizing liquids with use of membrane filter. 4,872,974, Cl. 210-90.000.
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Hirosawa, Makoto, to Dainippon Screen Mfg. Co., Ltd. Image reader having spectroscope for color separation. 4,873,569, Cl. 358-75.000.
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Hirota, Toshio; Ohuchi, Takashi; and Yamamoto, Osamu, to Fuji Electric Co., Ltd. Fuel cell manifolds. 4,873,155, Cl. 429-26.000.
Hirotomi, Jun, to Seiko Instruments Inc. Driving circuit for actuator. 4,873,477, Cl. 318-603.000.
Hislop, Alfred R., to United States of America, Navy. Internal transmission line filter element. 4,873,501, Cl. 333-204.000.
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Asano, Katuhiko; and Suzuki, Takao, 4,872,314, Cl. 62-49.100.
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Hori, Ryoichi; Itoh, Kiyoo; Kitsukawa, Goro; Kawajiri, Yoshiki; Watanabe, Takao; and Kawahara, Takayuki, 4,873,673, Cl. 365-230.060.
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Satoh, Motohiro; Yamada, Toshihiro; Kohono, Akiomi; Yamamoto, Akihiko; Taguchi, Keiji; Daikoku, Takahiro; and Kobayashi, Fumiuki, 4,872,606, Cl. 228-121.000.
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Hittler, Kurt D., to Grayling Industries, Inc. Method of removing hazardous material. 4,872,252, Cl. 29-426.400.
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Hobbs, Frank W.; and Meek, James L., to Du Pont de Nemours, E. I., and Company. Process for regioselectively preparing phosphorylated inositols and other cyclitols. 4,873,355, Cl. 558-161.000.
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Hammann, Peter; Grabley, Susanne; Raether, Wolfgang; Ciommer, Bernd; Kluge, Heinz; and Sachse, Burkhard, 4,873,347, Cl. 549-267.000.
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Hogan, Jim S. Apparatus for the treatment of waste. 4,872,954, Cl. 202-105.000.
Hoge, Ross A., to M-A-N Ashton Inc. Folder for business forms press. 4,872,658, Cl. 270-39.000.
Hokanson, John L.; Smeltz, Palmer D., Jr.; Yanushefski, Katherine A.; Yanushefski, Michael J.; and Young, Craig A., to American Telephone and Telegraph Company; and AT&T Bell Loboratories, AT&T Technologies Inc. Multilayer ceramic laser package. 4,873,566, Cl. 357-74.000.
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Holtermann, Heinz; and Luven, Arno, to Technometal Gesellschaft fur Metalltechnologie mbH. Reaction vessel for processing steel. 4,872,648, Cl. 266-275.000.
Holub, Fred F.; Abolins, Visvaldis; and Rock, John A., to General Electric Company. Flame retardant ternary blends of polyetherimide, polyphenylene ether and block copolymer of a vinyl aromatic hydrocarbon and an alkene compound. 4,873,287, Cl. 525-92.000.

Holy, Franz; and List, Walter, to Maschininfabrik Heid Aktiengesellschaft. Workpiece positioner for chuck and center machining. 4,872,380, Cl. 82-124.000.
Holzman, Richard W., to Falk Company, The. Air cooling of enclosed gear drives. 4,872,502, Cl. 165-39.000.
Homan, Charles J.: *See*—
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Tsubakimoto, Tsuneo; Ito, Hayami; Tatsumi, Shuhei; Kajibata, Yoshihiro; Takao, Shoichi; Goto, Takakiyo; Nakaishi, Akio; Rakutani, Kenji; Tamura, Toshio; and Kobayashi, Hiroya, 4,872,885, Cl. 44-51.000.

Ito, Masazumi, to Minolta Camera Kabushiki Kaisha. Recording apparatus with optical fiber cable interconnecting microcomputers. 4,873,431, Cl. 250-227.000.

Ito, Mitsuhiko: *See*—
Kato, Toshio; Uotani, Kunihiro; and Ito, Mitsuhiko, 4,872,659, Cl. 271-9.000.

Ito, Ryoji: *See*—
Wakamori, Takehisa; Ogawa, Takashi; Ito, Ryoji; and Shimanaka, Chikafumi, 4,872,257, Cl. 29-701.000.

Ito, Takayasu: *See*—
Furuhata, Takashi; Owashi, Hitoaki; Ito, Takayasu; and Hamaguchi, Masakazu, 4,873,582, Cl. 358-310.000.

Ito, Tetsuo: *See*—
Kinoshita, Mitsuo; Ito, Tetsuo; Mikawa, Hiroji; and Chino, Koichi, 4,872,948, Cl. 159-6.200.

Ito, Toshiyasu: *See*—
Fujisawa, Norio; Sakamoto, Toshishige; Ito, Toshiyasu; and Shimada, Junichi, 4,872,745, Cl. 350-357.000.

Itoh, Junichi: *See*—
Matsuzaki, Minoru; Itoh, Junichi; and Watanabe, Youji, 4,873,543, Cl. 354-402.000.

Itoh, Kiyonobu: *See*—
Nakamura, Kazuharu; Mito, Yoshio; Nakanishi, Yutaka; Yamada, Toshihiko; Nakamura, Kenji; and Itoh, Kiyonobu, 4,872,829, Cl. 431-33.000.

Itoh, Kiyoo: *See*—
Hori, Ryoichi; Itoh, Kiyoo; Kitsukawa, Goro; Kawajiri, Yoshiki; Watanabe, Takao; and Kawahara, Takayuki, 4,873,673, Cl. 365-230.060.

Itou, Takeo; Matsuda, Hidemi; Yoshizako, Mamoru; and Yagi, Osamu, to Kabushiki Kaisha Toshiba; and Tama Chemicals Co., Ltd. Method of manufacturing cathode-ray tube. 4,873,120, Cl. 427-64.000.

It's A Peach, Inc.: *See*—
Rearwin, Earle W.; and Rearwin, Gayle L., 4,872,324, Cl. 66-172.00E.

ITT Standard of ITT Corporation: *See*—
Fuerschbach, Raymond F.; Creighton, Timothy P.; and Fijas, David F., 4,872,578, Cl. 165-167.000.

Ittemann, Peter; and Eisenbarth, Philipp, to BASF Aktiengesellschaft. Heat-curable molding compositions. 4,873,284, Cl. 524-548.000.

Iversen, Arthur H. Compact high power modular RF semi-conductor systems packaging. 4,873,613, Cl. 361-385.000.

Ivex Corporation: *See*—
Blanton, Keith A.; Finlay, William M.; Sinclair, Michael J.; and Tumblin, John E., 4,873,585, Cl. 358-335.000.

Iwamoto, Keiichi: *See*—
Okabe, Yoshimi; Iwamoto, Keiichi; Torichigai, Masaaki; Kaneko, Shozo; Ichinari, Joji; and Koizumi, Kiyoshi, 4,872,347, Cl. 73-634.000.

Iwamoto, Takashi: *See*—
Kurakake, Mitsuo; Sakamoto, Keiji; and Iwamoto, Takashi, 4,873,476, Cl. 318-568.220.

Iwao, Tomoyoshi: *See*—
Shinoda, Kenichi; Iwao, Tomoyoshi; Isayama, Tomoaki; and Higo, Yuichi, 4,873,149, Cl. 428-609.000.

Iwasaki, Masahiro: *See*—
Nakagawa, Kazushige; Koh, Makoto; Sera, Kyoji; Ozeki, Tadashi; and Iwasaki, Masahiro, 4,872,394, Cl. 91-506.000.

Iwasaki, Rumi: *See*—
Kono, Koichi; Okamoto, Kenkichi; Iwasaki, Rumi; and Sawada, Shuichi, 4,873,034, Cl. 264-41.000.

Iwase, Sumio: *See*—
Yamanouchi, Kiyoshi; and Iwase, Sumio, 4,873,713, Cl. 379-67.000.

Iwase, Yoshiki; and Kobayashi, Yasuhito, to Fuji Photo Film Co. Ltd. Field/frame conversion circuit. 4,873,581, Cl. 358-310.000.

Iwata, Michihiro: *See*—
Tanaka, Yoshihiro; Tsuji, Sadafusa; Hata, Yoshiaki; Inoue, Manabu; Ootsuka, Hiroshi; Iwata, Michihiro; Ishito, Fumiaki; and Hayama, Koh, 4,873,544, Cl. 354-457.000.

J. C. Parry & Sons, Inc.: *See*—
Parry, Daniel J.; and Parry, John C., 4,872,623, Cl. 242-96.000.

J. R. Short Milling Company: *See*—
Short, Allen T.; and Wilkinson, Raleigh J., 4,873,110, Cl. 426-621.000.

Jacks, Terry C.: *See*—
Edmundson, Robert J.; and Jacks, Terry C., 4,873,078, Cl. 424-64.000.

Jackson, Davis G. Solid waste retriever. 4,872,977, Cl. 210-173.000.

Jackson, Lauren, to Chicopee. Fused laminated fabric and panty liner including same. 4,872,870, Cl. 604-366.000.

Jackson, Richard A.; Abt, John; and Barnett, Ronnie D., to Grass Valley Group, Inc., The. Digital video effects apparatus. 4,873,568, Cl. 358-22.000.

Jacobs, Wayne, to Johnson Matthey Inc. Solder paste. 4,872,928, Cl. 148-24.000.

Jaeger, Helmut: *See*—
Schulz, Guenther; Druschke, Wolfgang; and Jaeger, Helmut, 4,873,023, Cl. 260-404.800.

Jaenichen, Paul N., Sr., to United States of America, Navy. Phase control mechanism for wave energy conversion. 4,872,309, Cl. 60-497.000.

Jager, Willem W.: *See*—
Sie, Swan T.; Drent, Eit; and Jager, Willem W., 4,873,267, Cl. 518-700.000.

Jahan, Muhammad S.: *See*—
Cooke, D. Wayne; and Jahan, Muhammad S., 4,873,444, Cl. 250-337.000.

Jakfalvi, Elemer: *See*—
Petocz, Lujza; Simonyi, Istvan; Beck, Ivan; Gigler, Gabor; Fekete, Marton; Kiszelly, Eniko ; Mandi, Attila; Gorgenyi, Frigyes; Dietz, Andras; Sumeg nee Zukovics, Katalin; and Jakfalvi, Elemer, 4,873,249, Cl. 514-275.000.

Jakob, Paul G. Method and apparatus for removing organic liquids from water. 4,872,994, Cl. 210-691.000.

Jakob, Wolfgang; Alewelt, Wolfgang; and Tresper, Erhard, to Bayer Aktiengesellschaft. Process for the preparation of N-alkylated caprolactams. 4,873,326, Cl. 540-538.000.

Jalkio, Jeffrey A.; and Case, Steven K., to CyberOptics Corporation. Use of prisms to obtain anamorphic magnification. 4,872,747, Cl. 350-421.000.

James River-Norwalk, Inc.: *See*—
Allan, John L.; Boettcher, Jeffery J.; Gaylord, Norman G.; and Katz, Leon, 4,873,273, Cl. 523-407.000.

Jankower, Laura J.; and Shipley, Larry W., to Advanced Polymer Systems, Inc. Controlled release formulating employing resilient microbeads. 4,873,091, Cl. 424-489.000.

Janni, Albert S., to Duro-Last Roofing, Inc. Corner pieces for single-ply polymer-coated fabric core roof membranes and the product thereby formed. 4,872,296, Cl. 52-58.000.

Jansen, Johannes J.; Mossou, Bernardus H. F.; and Poort, Hans, to Cooperatieve Verkoop- en Produtievereniging van Aardappelmeel en Derivaten 'AVEBE' B.A. Process for waterproofing starch binders. 4,873,147, Cl. 428-533.000.

Japan Exlan Company Limited: *See*—
Kobashi, Toshiyuki; and Naka, Hideo, 4,873,352, Cl. 556-105.000.
Tanaka, Kojii, 4,873,143, Cl. 428-373.000.

Jarrett, Jawrence P., to Air Products and Chemicals, Inc. Remotely controlled operator for gas cylinder valve. 4,872,482, Cl. 137-554.000.

Jarvenkyla, Jyri, to Oy Uponor AB. Method for the formation of a hole in a plastic pipe. 4,873,048, Cl. 264-504.000.

Jean-Claude, Legrand; and Gefard, Prevot, to Ferco International. Casement lock, notably of the type comprising a plurality of operating rods with resilient return means. 4,872,716, Cl. 292-336.300.

Jeco Co.,Ltd.: *See*—
Sonoda, Hidefumi; Mori, Eiji; Kawase, Mitsuo; Yoneshige, Kazuhiro; Takahashi, Akira; Komiya, Hirokazu; and Tanaka, Akira, 4,872,439, Cl. 123-518.000.

Jefferis, Brian C., to Sarasota Automation Limited. Inductive loop presence detector with cross talk filter. 4,873,494, Cl. 331-65.000.

Jefferson, Chris A.: *See*—
McVay, David R.; Carter, Lawrence D.; Jonasky, John D.; and Jefferson, Chris A., 4,872,939, Cl. 156-354.000.

Jenkins, Dianne M.; and Pargeter, Christopher, to Alcan International Limited. Shaping anodic aluminum oxide sheet. 4,873,047, Cl. 264-322.000.

Jenkins, John W.: *See*—
Shutt, Eric; Altena, Andries G.; and Jenkins, John W., 4,873,388, Cl. 585-500.000.

Jenkinson, Margaret; and Dunne, John, to 501 Abbeybench Limited. Glassware grinding and/or polishing apparatus. 4,872,290, Cl. 51-109.00R.

Jensen, Millard J.; and Levine, Jules D., to Texas Instruments Incorporated. Method of bonding semiconductor material to an aluminum foil. 4,872,607, Cl. 228-180.100.

Jensen, Richard E.; Nichols, Donald H.; and Hemphill, D. Gary, to Forensic Applications Corporation. Method and apparatus for the collection and preservation of fluid biological evidence. 4,873,193, Cl. 436-176.000.

Jeol Ltd.: *See*—
Mori, Nobufumi; Katoh, Takayuki; Oikawa, Tetsuo; Harada, Yoshiyasu; and Miyahara, Junji, 4,873,440, Cl. 250-327.200.

Jerabek, Elihu C.: *See*—
Foust, Donald F.; Lamby, Edward J.; Karas, Bradley R.; Dumas, William V.; and Jerabek, Elihu C., 4,873,136, Cl. 428-209.000.

Jiang, Ching-Lin; and Williams, Clark R., to Dallas Semiconductor Corporation. Dual storage cell memory including data transfer circuits. 4,873,665, Cl. 365-154.000.

JLF Designs, Inc.: *See*—
Fournier, James L., 4,872,538, Cl. 190-111.000.

Jochim, Michael M.; and Jones, Suzanne C., to United States of America, Argriculture. Monoclonal antibodies to bluetongue virus antigen. 4,873,189, Cl. 435-68.000.

Joh, Yasushi, to UBE Industries, Ltd. Compositions having antithrombogenic properties and blood contact medical devices using the same. 4,872,867, Cl. 604-269.000.

Johdai, Akiyoshi: *See*—
Ishikawa, Takuma; Maruyama, Tadashi; Johdai, Akiyoshi; Ishiguro, Kuniaki; and Matsui, Toshio, 4,872,662, Cl. 271-290.000.

John Fluke Mfg. Co., Inc.: *See*—
Johnson, Craig V., 4,873,705, Cl. 371-21.200.

John Wyeth & Brother Limited: *See*—
Crossley, Roger, 4,873,237, Cl. 514-222.800.

Johns Hopkins University, The: *See*—
Chen, Chung-Ho; and Chen, Sumi C., 4,873,186, Cl. 435-1.000.

Johns, Owen L., to Smith & Nephew (Latin America), Inc. Low profile ostomy device. 4,872,869, Cl. 604-342.000.

Johnson, Bertram C.; DiFonzo, John C.; and Herbst, Richard L., to Spectra-Physics. Pulsed tunable solid state laser. 4,873,692, Cl. 372-20.000.

Johnson, Carl R.; and Penning, Thomas D., to Board of Governors of Wayne State University. Process for the preparation of cyclopentanoids and novel intermediates produced thereby. 4,873,360, Cl. 560-121.000.

Johnson, Craig V., to John Fluke Mfg. Co., Inc. Method of and system for high-speed, high-accuracy functional testing of memories in microprocessor-based units. 4,873,705, Cl. 371-21.200.

Johnson, David L.: *See*—
Avidan, Amos A.; and Johnson, David L., 4,873,385, Cl. 585-415.000.
Avidan, Amos A.; and Johnson, David L., 4,873,389, Cl. 585-533.000.

Johnson, David W., Jr.: *See*—
Fleming, James W.; Johnson, David W., Jr.; MacChesney, John B.; and Pardenek, Sandra A., 4,872,895, Cl. 65-18.100.

Johnson, Donald S.: *See*—
Critton, Thomas J.; Johnson, Donald S.; Pukalo, Walter P.; and Yorio, Ralph, 4,872,369, Cl. 74-574.000.

Johnson Electric Industrial Manufactory Limited: *See*—
Wang, Patrick S., 4,873,464, Cl. 310-249.000.

Johnson, Glenn W., Jr. Knee brace having adjustable inflatable U-shaped air cell. 4,872,448, Cl. 128-80.00C.

Johnson, Harold K., to Mid America Machine Corp. Bag top forming method and apparatus. 4,872,303, Cl. 53-481.000.

Johnson, Joel R.: *See*—
Streich, Herbert K.; Leach, Robert D.; Johnson, Joel R.; Olson, Thomas B.; and Townsend, Donald L., 4,873,422, Cl. 219-370.000.

Johnson, Lynn A.: *See*—
Proxmire, Deborah L.; Endres, Dan D.; Wilson, John C.; Johnson, Lynn A.; Zehner, Georgia L.; Boland, Leona G.; and Stevens, Robert A., 4,872,871, Cl. 604-394.000.

Johnson, Marion; and Hahn, Granville J., to Permian Research Corporation. Plastic closure with barrier coating. 4,872,573, Cl. 215-347.000.

Johnson Matthey Inc.: *See*—
Jacobs, Wayne, 4,872,928, Cl. 148-24.000.

Johnson Matthey Public Limited Company: *See*—
Shutt, Eric; Altena, Andries G.; and Jenkins, John W., 4,873,388, Cl. 585-500.000.

Johnson, Paul D.; Kubicko, Robert E.; Martone, Louis C.; and Moores, Gregory E., to Black & Decker Corporation. Carafe-operated coffee brewing system. 4,872,402, Cl. 99-280.000.

Johnson, Richard G., to Warn Industries, Inc. Winch with shut-off load limiter. 4,873,474, Cl. 318-434.000.

Johnson, Robert R.; and Orbanic, Robert S., to GTE Products Corporation. Method of making pre-formed lead-ins for an IC package. 4,872,260, Cl. 29-827.000.

Johnson Service Company: *See*—
Demeter, Michael G.; Wichman, Paul E.; Endres, Linda S.; and Rohrer, Charles E., 4,872,397, Cl. 98-31.600.

Johnson, Trevor A.; and Gorscak, Sharon L., to Raycon Corporation. Method for welding galvanized material. 4,873,415, Cl. 219-121.640.

Johnson, Van P. Adjustable overhead hanger with lock pulley. 4,872,632, Cl. 248-332.000.

Joly, Jean-Louis: *See*—
Vaillant De Guelis, Hubert; and Joly, Jean-Louis, 4,872,357, Cl. 74-5.100.

Jonasky, John D.: *See*—
McVay, David R.; Carter, Lawrence D.; Jonasky, John D.; and Jefferson, Chris A., 4,872,939, Cl. 156-354.000.

Jones, Alun G.; Davison, Alan; Kronauge, James; and Abrams, Michael J., to Massachusetts Institute of Technology; and President and Fellows of Harvard College. Carboxy, carboalkoxy and carbamile substituted isonitrile radionuclide complexes. 4,872,561, Cl. 206-569.000.

Jones, Charles: *See*—
Hartfeil, Guenther, 4,872,705, Cl. 283-67.000.

Jones, Gareth. D.C. electric motor. 4,873,463, Cl. 310-68.00B.

Jones, Gerald M.; and Nemcovsky, Rhonda L., to GTE Products Corporation. Adjustable footprint component removal tool. 4,872,259, Cl. 29-764.000.

Jones, Harry E. Shallow water indicator for a boat. 4,873,523, Cl. 340-984.000.

Jones, Jack E.; and Bulmahn, David J., to NCR Corporation. Heat sink for an electronic device. 4,872,505, Cl. 165-80.300.

Jones, James V., to PPG Industries, Inc. Dark, neutral, gray, nickel-free glass composition. 4,873,206, Cl. 501-71.000.

Jones, John I.: *See*—
Davis, Cecil J.; Abernathy, Joseph V.; Matthews, Robert T.; Hildenbrand, Randall C.; Simpson, Bruce; Jones, John I.; Loewen-

stein, Lee M.; and Bohlman, James G., 4,872,938, Cl. 156-345.000.

Jones, Suzanne C.: *See*—
Jochim, Michael M.; and Jones, Suzanne C., 4,873,189, Cl. 435-68.000.

Jones, Wallace R.; and Isaksen, Robert A., to Excello Specialty Company, The. Surface protector with expansible pocket. 4,873,132, Cl. 428-80.000.

Jorstad, Storker; and Smedby, Leif, to Fabio Fasting Biotech A/S. Device for the removal of cryoglobulins. 4,872,978, Cl. 210-181.000.

Joseph Patrick McGillis: *See*—
McGillis, Joseph P.; and Fly, Howard G., 4,872,668, Cl. 272-130.000.

Jugel, Alfred: *See*—
Schmidt, Lothar; and Jugel, Alfred, 4,873,694, Cl. 370-58.100.

Juichiro, Takada. Guide device for the drive tape of an automatic seat belt system. 4,872,602, Cl. 226-196.000.

JUKI Corporation: *See*—
Taguchi, Katsuhiko; and Mitsumori, Kazuya, 4,873,595, Cl. 360-99.050.

Juliana, Anthony; Leung, Wai C.; Pan, Victor T.; Rosen, Hal J.; and Strand, Timothy C., to International Business Machines Corporation. Method and apparatus for optically measuring characteristics of a thin film by directing a P-polarized beam through an integrating sphere at the brewster's angle of the film. 4,873,430, Cl. 250-225.000.

Julius Blum Gesellschaft M.B.H.: *See*—
Rock, Erich; and Brunner, Josef, 4,872,735, Cl. 312-342.000.

Jung, Il Nam; Hwang, Sang Yo; and Lee, Chung Suk, to Korea Advanced Institute of Science and Technology. Antifreeze corrosion inhibitor composition for aluminum engines and radiators. 4,873,011, Cl. 252-75.000.

Junge, Bodo; Richter, Bernd; Glaser, Thomas; Traber, Jorg; and Allen, George S., to Bayer Aktiengesellschaft. 8-Substituted 2-aminotetralins. 4,873,262, Cl. 514-510.000.

Jurgens, Rainer, to Eastman Christensen Company. Method for transmitting downhole data in a reduced time. 4,873,522, Cl. 340-853.000.

Kabbeck-Kupijai, Detlef: *See*—
Scheer, Wolfgang; Fuhrmann, Hartmut; Kossmehl, Gerhard; Niemitz, Matthias; and Kabbeck-Kupijai, Detlef, 4,872,962, Cl. 204-224.00R.

Kabe, Kazuyuki: *See*—
Hanada, Ryoji; Morikawa, Tuneo; and Kabe, Kazuyuki, 4,872,497, Cl. 152-541.000.

K.K. Chibakou Shoji: *See*—
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Kabushiki Kaisha Akita: *See*—
Kubo, Yoshimasa; Hondo, Masao; Tanaka, Masashi; and Asahi, Akihiko, 4,873,195, Cl. 435-254.000.

Kabushiki Kaisha Kobe Seiko Sho: *See*—
Kaji, Kichiro; Shimasaki, Katsunori; Yamamoto, Masakazu; Saiki, Kozo; Yura, Keita; Habata, Hidetsugu; Kimura, Isao; and Suzuki, Tetsuo, 4,873,070, Cl. 423-345.000.
Wakabayashi, Minoru; Murata, Hiroyuki; Sugino, Yasuo; Yamao, Masanobu; and Nishikawa, Takao, 4,872,972, Cl. 209-143.000.

Kabushiki Kaisha Nippon Coinco: *See*—
Hayashi, Yukichi, 4,872,541, Cl. 194-217.000.

Kabushiki Kaisha Shinsangyokaihatsu: *See*—
Katsuo, Suzuki, 4,873,526, Cl. 342-359.000.

Kabushiki Kaisha Toshiba: *See*—
Iida, Tetsuya, 4,873,525, Cl. 341-145.000.
Iida, Toshikatsu; Fujiwara, Takayoshi; and Sone, Yoshinori, 4,872,820, Cl. 418-220.000.
Ishii, Takaaki; and Kuge, Toru, 4,873,714, Cl. 379-88.000.
Itou, Takeo; Matsuda, Hidemi; Yoshizako, Mamoru; and Yagi, Osamu, 4,873,120, Cl. 427-64.000.
Kubota, Tooru; and Mori, Hiroyuki, 4,873,579, Cl. 358-471.000.
Minowa, Takehiko; and Yamamoto, Toshifumi, 4,873,536, Cl. 346-76.0PH.
Murata, Moriyoshi, 4,872,446, Cl. 128-6.000.
Nagata, Mitsuhiro; Hayashi, Tadashi; Hashimoto, Yoshinobu; and Nakamura, Kiyoshi, 4,873,208, Cl. 501-89.000.
Sato, Hideki; and Mizunoya, Nobuyuki, 4,873,151, Cl. 428-627.000.
Tanaka, Yasunori; and Hashimoto, Hideo, 4,873,670, Cl. 365-189.110.

Kadowaki, Koju; Sarumaru, Kohei; and Shibano, Takeshi, to Mitsubishi Petrochemical Company Limited. Process for producing acrylic acid. 4,873,368, Cl. 562-532.000.

Kadowaki, Toshihiro: *See*—
Suzuki, Yasumichi; Ikeda, Yoshinori; Katoh, Koichi; Ohnishi, Tetsuya; Kadowaki, Toshihiro; and Honma, Toshio, 4,873,570, Cl. 358-80.000.

Kaga, Koichi; Hosoi, Akio; and Yamaguchi, Takao, to Toyoda Gosei Co., Ltd. Steering wheel. 4,872,364, Cl. 74-484.00H.

Kaga, Toru; Kimura, Shinichiro; Kure, Tokuo; Kawamoto, Yoshifumi; and Sunami, Hideo, to Hitachi, Ltd. Method for formation of insulation film on silicon buried in trench. 4,873,203, Cl. 437-67.000.

Kaga, Toru: *See*—
Sunami, Hideo; Kimura, Shinichiro; and Kaga, Toru, 4,873,560, Cl. 357-23.600.

Kageyama, Hidehei; Mitsuya, Yoshihide; and Nakazato, Yoichi, to Kotobuki & Co., Ltd. Lead chuck of mechanical pencil. 4,872,776, Cl. 401-65.000.

Kahn: David A.; Pacey, Grant K.; Hvezda, Jaroslav M.; and Dalgleish, Jack F., to Northern Telecom Ltd. Optical busbar. 4,872,739, Cl. 350-96.160.

Kai, Mariko: *See*—
Nohira, Hiroyuki; Kamei, Masanao; Nakamura, Shinichi; Yoshinaga, Kazuo; Kai, Mariko; and Katagiri, Kazuharu, 4,873,018, Cl. 252-299.010.

Kaiser, Carl; Kruse, Lawrence I.; and Ross, Stephen T., to SmithKline Beckman Corporation. Trifluoro acetyl-cyano-aniline intermediates for dopamine-βhydroxylase inhibitors. 4,873,357, Cl. 558-414.000.

Kaito, Noboru: *See*—
Nagai, Noboru; Hashimoto, Yoshisato; Tsuboike, Yoshihiko; and Kaito, Noboru, 4,872,308, Cl. 60-316.000.

Kaji, Kichiro; Shimasaki, Katsunori; Yamamoto, Masakazu; Saiki, Kozo; Yura, Keita; Habata, Hidetsugu; Kimura, Isao; and Suzuki, Tetsuo, to Kabushiki Kaisha Kobe Seiko Sho. Process for producing silicon carbide whiskers. 4,873,070, Cl. 423-345.000.

Kajibata, Yoshihiro: *See*—
Tsubakimoto, Tsuneo; Ito, Hayami; Tatsumi, Shuhei; Kajibata, Yoshihiro; Takao, Shoichi; Goto, Takakiyo; Nakaishi, Akio; Rakutani, Kenji; Tamura, Toshio; and Kobayashi, Hiroya, 4,872,885, Cl. 44-51.000.

Kajikawa, Teruo; and Yoshino, Toshio, to Nippon Oil Co., Ltd. Method for manufacturing carpet tiles having excellent dimensional stability. 4,872,930, Cl. 156-72.000.

Kajikiyo, Katuji: *See*—
Niwa, Katuhiro; Abe, Nobuyasu; Kajikiyo, Katuji; Suzuoki, Tsutomu; Tabuti, Katumi; and Arii, Yoshifumi, 4,872,383, Cl. 83-175.000.

Kajiyama, Toshiki: *See*—
Tobita, Toshimitsu; Inaba, Hiromi; Yamazaki, Masachika; Suzuki, Masato; Morita, Yuzo; Kajiyama, Toshiki; Nakamura, Kiyoshi; and Yoneda, Kenji, 4,872,532, Cl. 187-121.000.

Kakei, Tsutomu: *See*—
Uesugi, Akio; Kakei, Tsutomu; and Minato, Shinichiro, 4,872,946, Cl. 156-637.000.

Kalazny, Andrzej: *See*—
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Kamakura, Takuro: *See*—
Suzuki, Tameyuki; and Kamakura, Takuro, 4,873,175, Cl. 430-311.000.

Kamano, Yoshiaki: *See*—
Pettit, George R.; and Kamano, Yoshiaki, 4,873,245, Cl. 514-250.000.

Kameda, Eiichi, to Nippon Mektron, Ltd. Method of producing hybrid multi-layered circuit substrate. 4,872,934, Cl. 156-250.000.

Kamei, Masanao: *See*—
Nohira, Hiroyuki; Kamei, Masanao; Nakamura, Shinichi; Yoshinaga, Kazuo; Kai, Mariko; and Katagiri, Kazuharu, 4,873,018, Cl. 252-299.010.

Kameyama, Toshiaki; and Kobayashi, Yuichi, to Ricoh Company, Ltd. Sheet feed device for recording apparatus. 4,872,660, Cl. 271-9.000.

Kamieniecki, Emil; Reiss, Leszek; and Goldfarb, William C., to Optical Diagnostic Systems, Inc. Nondestructive readout of a latent electrostatic image formed on an insulating material. 4,873,436, Cl. 250-315.300.

Kanada, Euji: *See*—
Nishinoiri, Hiroshi; Saikawa, Masahiko; Takaya, Yoshikazu; and Kanada, Euji, 4,873,170, Cl. 430-204.000.

Kanai, Tsutomu: *See*—
Yoshioka, Takao; Kanai, Tsutomu; Aizawa, Yuichi; Horikoshi, Hiroyoshi; and Hasegawa, Kazuo, 4,873,255, Cl. 514-369.000.

Kanai, Tsuyoshi: *See*—
Komatsu, Masato; Baba, Isao; Mikami, Takashi; Narukawa, Kiyotada; and Kanai, Tsuyoshi, 4,873,288, Cl. 525-194.000.

Kanamaru, Hisanobu: *See*—
Doi, Masayuki; Asahi, Naotatsu; Kojima, Yoshitaka; Kanamaru, Hisanobu; and Aoyama, Susumu, 4,873,150, Cl. 428-627.000.

Kanaya, Yasuhiko: *See*—
Arai, Kunio; Nishiyama, Hiromi; Aoyama, Hiroshi; and Kanaya, Yasuhiko, 4,872,787, Cl. 408-1.00R.

Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See*—
Wachi, Shun; Ariki, Yuusaku; and Oshima, Hiroshi, 4,873,384, Cl. 570-247.000.

Kanehira, Katsuyaki; Takayama, Syuichi; Amano, Atsushi; Hibino, Hiroki; Uchiyama, Naoki; and Nakada, Akio, to Olympus Optical Co., Ltd. Thermotherapy apparatus. 4,872,458, Cl. 128-401.000.

Kaneko, Norio: *See*—
Shimizu, Akira; and Kaneko, Norio, 4,873,610, Cl. 361-313.000.

Kaneko, Shozo: *See*—
Okabe, Yoshimi; Iwamoto, Keiichi; Torichigai, Masaaki; Kaneko, Shozo; Ichinari, Joji; and Koizumi, Kiyoshi, 4,872,347, Cl. 73-634.000.

Kaneko, Yutaka: *See*—
Tachibana, Kimie; Kaneko, Yutaka; and Ishii, Fumio, 4,873,183, Cl. 430-550.000.

Kanekura, Kazunori: *See*—
Hirose, Yoshihiko; Aoki, Tomohiro; Chiku, Kazuyoshi; Murayama, Yasushi; Uchida, Takashi; Matsuzawa, Kunihiko; and Kanekura, Kazunori, 4,873,541, Cl. 346-160.100.

Kaneshiki, Toshitaka; Narukawa, Osamu; Haneda, Tadayoshi; and Endo, Toshiyuki, to Hodogaya Chemical Co., Ltd. Method for selective isolation of Dichlorobenzene. 4,873,383, Cl. 570-211.000.

Kanner, Rowland W.: *See*—
Ryder, Francis E.; Kanner, Rowland W.; and Williams, Fred E., 4,873,424, Cl. 219-521.000.

Kanto Yakin Kogyo Kabushiki Kaisha: *See*—
Takahashi, Susumu, 4,873,423, Cl. 219-390.000.

Kao Corporation: *See*—
Tanaka, Yukitaka; Omura, Hisao; Irinatsu, Yuuichi; Kobayashi, Takashi; and Noguchi, Aiko, 4,873,109, Cl. 426-607.000.

Kapgan, Michael, to Raychem Corporation. Coupling device. 4,872,713, Cl. 285-381.000.

Kapples, Kevin J.: *See*—
Shutske, Gregory M.; and Kapples, Kevin J., 4,873,234, Cl. 514-211.000.

Karakida, Ken-ichi; and Yagi, Shigeru, to Fuji Xerox Co., Ltd. Electrophotographic photoreceptor having overlayer comprising carbon. 4,873,165, Cl. 430-66.000.

Karanewsky, Donald S.: *See*—
Petrillo, Edward W., Jr.; Karanewsky, Donald S.; Thottathil, John K.; Heikes, James E.; and Grosso, John A., 4,873,356, Cl. 558-180.000.

Karas, Bradley R.: *See*—
Foust, Donald F.; Lamby, Edward J.; Karas, Bradley R.; Dumas, William V.; and Jerabek, Elihu C., 4,873,136, Cl. 428-209.000.

Karunasiri, Runkiri P.: *See*—
Coon, Darryl D.; Karunasiri, Runkiri P.; and Liu, Hui C., 4,873,555, Cl. 357-4.000.

Kasai Kogyo Co., Ltd.: *See*—
Fujita, Zenzo; Morita, Hirokiyo; and Morishita, Sadao, 4,873,045, Cl. 264-259.000.

Kasamura, Toshirou: *See*—
Sasaki, Nobukazu; Kasamura, Toshirou; Ohashi, Masashi; Okuda, Naoki; Kusumoto, Toshihiko; Maeda, Yasunori; Ozawa, Takashi; Yamamoto, Yasuyoshi; Kubota, Atsushi; Kimura, Akiyoshi; and Masuda, Makoto, 4,873,547, Cl. 355-316.000.

Kashima, Toshihiro; and Fukuda, Minoru, to Toyo Boseki Kabushiki Kaisha. Optical recording medium. 4,873,131, Cl. 428-64.000.

Kashiwamura, Kazuo: *See*—
Kazumoto, Yoshio; Suganami, Takuya; Furuishi, Yoshiro; and Kashiwamura, Kazuo, 4,872,313, Cl. 62-6.000.

Kastalsky, Alexander: *See*—
Abeles, Joseph H.; Kastalsky, Alexander; and Leheny, Robert F., 4,872,744, Cl. 350-356.000.

Katagiri, Kazuharu: *See*—
Nohira, Hiroyuki; Kamei, Masanao; Nakamura, Shinichi; Yoshinaga, Kazuo; Kai, Mariko; and Katagiri, Kazuharu, 4,873,018, Cl. 252-299.010.

Kataoka, Kazunori: *See*—
Ogata, Naoya; Sanui, Kohei; Yui, Nobuhiko; Kataoka, Kazunori; Okano, Teruo; and Sakurai, Yasuhisa, 4,873,292, Cl. 525-408.000.

Katayama, Isao, to Murata Kikai Kabushiki Kaisha. Compound machining apparatus. 4,873,418, Cl. 219-121.600.

Katchka, Jay R.; Yeaman, George A.; and McKinney, Richard W., to Robertshaw Controls Company. Burner control device, system and method of making the same. 4,872,830, Cl. 431-54.000.

Kato, Etsuro, to Nissan Chemical Industries, Ltd. Powder of coagulated spherical zirconia particles and process for producing them. 4,873,064, Cl. 423-85.000.

Kato, Kiyotaka: *See*—
Matsui, Haruo; Nakagawa, Ippei; and Kato, Kiyotaka, 4,873,073, Cl. 423-617.000.

Kato, Toshio; Uotani, Kunihiro; and Ito, Mitsuhiko, to Ricoh Company, Ltd. Cassette with turn cover and feed roller control. 4,872,659, Cl. 271-9.000.

Kato, Toshiyuki: *See*—
Onodera, Kagetoshi; Koizumi, Tatsuya; Kato, Toshiyuki; Sotani, Junji; Momo, Masauki; and Furuya, Shuichi, 4,873,127, Cl. 427-376.800.

Kato, Yoshiaki: *See*—
Ono, Hitoshi; and Kato, Yoshiaki, 4,873,164, Cl. 430-58.000.

Katoh, Akira; Ida, Masatoshi; Yunoki, Yutaka; Harada, Hisayuki; Inoue, Manabu; and Fukuda, Yoshio, to Olympus Optical Co., Ltd. Detachable unit electronic camera. 4,873,580, Cl. 358-335.000.

Katoh, Koichi: *See*—
Suzuki, Yasumichi; Ikeda, Yoshinori; Katoh, Koichi; Ohnishi, Tetsuya; Kadowaki, Toshihiro; and Honma, Toshio, 4,873,570, Cl. 358-80.000.

Katoh, Takayuki: *See*—
Mori, Nobufumi; Katoh, Takayuki; Oikawa, Tetsuo; Harada, Yoshiyasu; and Miyahara, Junji, 4,873,440, Cl. 250-327.200.

Katoh, Tsuguhiro; Maeda, Kiyoto; Shiroshita, Masao; Yamashita, Norihisa; Sanemitsu, Yuzuru; and Inoue, Satoru, to Sumitomo Chemical Co., Ltd. Pyridinylpyrimidines having fungicidal activity. 4,873,248, Cl. 514-269.000.

Katsuo, Suzuki, to Aisin Seiki Kabushiki Kaisha; and Kabushiki Kaisha Shinsangyokaihatsu. Mobile station antenna attitude control apparatus. 4,873,526, Cl. 342-359.000.

Katsuragi, Shigeo: *See*—
Morishita, Masataka; Aikawa, Renji; Katsuragi, Shigeo; Yamamoto, Yoshiaki; and Sugimoto, Kenichi, 4,873,087, Cl. 424-433.000.

Katsuura, Yasuhiro: *See*—
Okamoto, Shosuke; Okada, Yoshio; Okunomiya, Akiko; Naito, Taketoshi; Kimura, Yoshio; Yamada, Morihiko; Ohno, Norio; Katsuura, Yasuhiro; Nojima, Hiroshi; and Shishikura, Takashi, 4,873,253, Cl. 514-352.000.

Katto, Takayuki: *See*—
Satake, Yoshikatsu; Iizuka, Yo; Kouyama, Toshitaka; Katto, Takayuki; and Shiiki, Zenya, 4,873,283, Cl. 524-520.000.

Katz, Leon: *See*—
Allan, John L.; Boettcher, Jeffery J.; Gaylord, Norman G.; and Katz, Leon, 4,873,273, Cl. 523-407.000.

Katz, Moshe: *See*—
Haruvy, Yair; Katz, Moshe; and Horowitz, Abraham A., 4,872,220, Cl. 2-243.00A.

Kaufman, Harold R.; and Robinson, Raymond S. Ion source with particular grid assembly. 4,873,467, Cl. 313-360.100.

Kaufman, Lawrence G.: *See*—
Moran, Lyle E.; and Kaufman, Lawrence G., 4,873,275, Cl. 524-64.000.

Kawahara, Takayuki: *See*—
Hori, Ryoichi; Itoh, Kiyoo; Kitsukawa, Goro; Kawajiri, Yoshiki; Watanabe, Takao; and Kawahara, Takayuki, 4,873,673, Cl. 365-230.060.

Kawajiri, Tatsuya; Onodera, Hideo; Uchida, Shinichi; Aoki, Yukio; and Wada, Masahiro, to Nippon Shokubai Kagaku Kogyo Co., Ltd. Catalyst for oxidation of olefin or tertiary alcohol and process for production thereof. 4,873,217, Cl. 502-311.000.

Kawajiri, Yoshiki: *See*—
Hori, Ryoichi; Itoh, Kiyoo; Kitsukawa, Goro; Kawajiri, Yoshiki; Watanabe, Takao; and Kawahara, Takayuki, 4,873,673, Cl. 365-230.060.

Kawakatsu, Akira, to Oki Electric Industry Co., Ltd. Method of fabricating a bipolar transistor. 4,873,200, Cl. 437-31.000.

Kawamata, Shigeya, to Mitsubishi Jukogyo Kabushiki Kaisha. Liquid type mass damper with elongated discharge tube. 4,872,649, Cl. 267-136.000.

Kawamoto, Yoshifumi: *See*—
Kaga, Toru; Kimura, Shinichiro; Kure, Tokuo; Kawamoto, Yoshifumi; and Sunami, Hideo, 4,873,203, Cl. 437-67.000.

Kawamura, Mitsuyoshi: *See*—
Akao, Shigeaki; Ishida, Noboru; and Kawamura, Mitsuyoshi, 4,872,431, Cl. 123-188.0AA.

Kawasaki, Hirofumi: *See*—
Takedoi, Atsushi; Kondo, Hiroyuki; Isoai, Masaru; Yoshinaga, Yoshitaka; Harada, Tosiharu; Okuda, Yosiro; Sumita, Hiroshi; Kawasaki, Hirofumi; and Mori, Kohji, 4,873,010, Cl. 252-62.590.

Kawasaki Jukogyo Kabushiki Kaisha: *See*—
Yasukawa, Wataru, deceased; Kiyoshige, Masanori; Horikawa, Takeshi; Okada, Tomonobu; Ochi, Tadafumi; Aoki, Yoshiaki; Higashida, Masahiko; Kawashima, Takashi; Koe, Shigeki; Ono, Hideo; Nihei, Kanta; Takasugi, Syunji; and Take, Koji, 4,872,293, Cl. 51-410.000.

Kawasaki Jukogyo Kagushiki Kaisha: *See*—
Tsubakimoto, Tsuneo; Ito, Hayami; Tatsumi, Shuhei; Kajibata, Yoshihiro; Takao, Shoichi; Goto, Takakiyo; Nakaishi, Akio; Rakutani, Kenji; Tamura, Toshio; and Kobayashi, Hiroya, 4,872,885, Cl. 44-51.000.

Kawasaki, Yoshiki; Hioki, Yoshihiro; Ohno, Yuichi; Ichida, Kozaburo; Yamaguchi, Susumu; Sudo, Michitaka; and Chikazawa, Bunichiro, to Nippon Steel Corporation. Method and apparatus for manufacturing cold-rolled steel strip. 4,872,245, Cl. 29-81.00A.

Kawase, Mitsuo: *See*—
Sonoda, Hidefumi; Mori, Eiji; Kawase, Mitsuo; Yoneshige, Kazuhiro; Takahashi, Akira; Komiya, Hirokazu; and Tanaka, Akira, 4,872,439, Cl. 123-518.000.

Kawashima, Takashi: *See*—
Yasukawa, Wataru, deceased; Kiyoshige, Masanori; Horikawa, Takeshi; Okada, Tomonobu; Ochi, Tadafumi; Aoki, Yoshiaki; Higashida, Masahiko; Kawashima, Takashi; Koe, Shigeki; Ono, Hideo; Nihei, Kanta; Takasugi, Syunji; and Take, Koji, 4,872,293, Cl. 51-410.000.

Kawatetsu Kenzai Kogyo Kabushiki Kaisha: *See*—
Imai, Katsuhiko, 4,872,779, Cl. 403-171.000.

Kaye, Arthur, to British Aerospace, PLC. Electro-hydraulic actuator assembly. 4,872,310, Cl. 60-567.000.

Kazumoto, Yoshio; Suganami, Takuya; Furuishi, Yoshiro; and Kashiwamura, Kazuo, to Mitsubishi Denki Kabushiki Kaisha. Gas cycle machine. 4,872,313, Cl. 62-6.000.

KB Alloys, Inc.: *See*—
Sigworth, Geoffrey K., 4,873,054, Cl. 420-552.000.

Keating, David: *See*—
Pilat, John; Keating, David; and Colella, Wayne, 4,873,652, Cl. 364-518.000.

Keene, Donna L.; and Hicks, Darrell D., to Hoechst Celanese Corporation. Protective coatings of a cured hydroxystyrene mannich base and blocked polyisocyantes. 4,872,960, Cl. 204-181.700.

Kegerreis, James E.: *See*—
Clem, Kenneth R.; Heider, Kenneth J.; Kegerreis, James E.; and Shoukry, Ehsan I., 4,872,967, Cl. 208-65.000.

Keiper Recaro Incorporated: *See*—
White, Harry H;; and Ligensa, Karl, 4,872,726, Cl. 297-367.000.

Keller, Fred, Jr. Ceramic aggregate for roadway composition and method of producing same. 4,873,207, Cl. 501-80.000.

Keller, Hans-Peter: *See*—
De Coi, Beat; and Keller, Hans-Peter, 4,873,621, Cl. 364-150.000.

Kellner, Carl S.; and Rao, V. N. Mallikarjuna, to Du Pont de Nemours, E. I., and Company. Hydrodehalogenation of CF_3CHClF in the presence of supported Pd. 4,873,381, Cl. 570-176.000.

Kelly, David L.: *See*—
Gillsdpy, Kenton P.; and Kelly, David L., 4,872,634, Cl. 248-354.300.

Kelly-Fry, Elizabeth; and Morris, Steven T., to Indianapolis Center for Advanced Research. Multiple frequencies from single crystal. 4,872,346, Cl. 73-627.000.

Kelly, Patrick J., Jr.: *See*—
Cavallaro, Joseph L.; and Kelly, Patrick J., Jr., 4,872,811, Cl. 416-162.000.

Kemp, Preston B., Jr.; and Holland, Robert J., Sr., to GTE Products Corporation. Coated metallic particles and process for producing same. 4,873,148, Cl. 428-570.000.

Kemper, Nicolaas R.; Bouwens, Henricus J. J.; Koster, Marinus P.; and De Peuter, Willem L. G., to U.S. Philips Corporation. Driving mechanism and manipulator comprising such a driving mechanism. 4,872,362, Cl. 74-479.000.

Kendall Company, The: *See*—
Etheredge, Robert W., III, 4,872,263, Cl. 30-41.000.

Kennel, Gordon. Combination infant seat and stroller. 4,872,693, Cl. 280-30.000.

Kern & Co.: *See*—
Wahlen, Erika, 4,872,341, Cl. 73-431.000.

Kernforschungsaniage Julich GmbH: *See*—
Struck, Bernd D.; Neumeister, Herbert; and Naoumidis, Aristides, 4,873,121, Cl. 427-77.000.

Kernforschungszentrum Karlsruhe GmbH: *See*—
Braun, Hartmut; and Vogg, Hubert, 4,873,065, Cl. 423-210.000.
Ehrfeld, Wolfgang; Hagmann, Peter; Mohr, Jurgen; and Munchmeyer, Dietrich, 4,872,888, Cl. 55-16.000.

Kesling, Haven S., Jr.: *See*—
Shawl, Edward T.; and Kesling, Haven S., Jr., 4,873,364, Cl. 560-344.000.

Kessel, Rudi: *See*—
Krejci, Heinrich; and Kessel, Rudi, 4,872,897, Cl. 65-128.000.

Khurgin, Boris. Ice detector with movable feeler. 4,873,510, Cl. 340-580.000.

Kido, Keishiro; and Saito, Yoshio, to Fuji Photo Film Co., Ltd. Pipette device. 4,873,059, Cl. 422-100.000.

Kielmeyer, Ronald F., Jr., to Motorola, Inc. Wide band voltage controlled R-C oscillator for use with MMIC technology. 4,873,497, Cl. 331-108.00B.

Kikkawa, Sadanobu: *See*—
Omura, Takashi; Kikkawa, Sadanobu; Morimitsu, Toshihiko; Harada, Naoki; and Miyamoto, Tetsuya, 4,873,321, Cl. 534-642.000.

Kikuchi, Eiichi: *See*—
Deya, Eiki; Yanahira, Shuichi; Abiko, Kenkichi; and Kikuchi, Eiichi, 4,873,229, Cl. 514-54.000.

Kim, Il Yoo. Trash container to be chemical sprayed. 4,872,585, Cl. 220-334.000.

Kim, In O.; and Lee, Sang G., to Korea Advanced Institute of Science and Technology. Process for the preparation of 3-(4'-bromobiphenyl-4-yl)tetralin-1-one. 4,873,363, Cl. 568-319.000.

Kimberly-Clark Corporation: *See*—
Proxmire, Deborah L.; Endres, Dan D.; Wilson, John C.; Johnson, Lynn A.; Zehner, Georgia L.; Boland, Leona G.; and Stevens, Robert A., 4,872,871, Cl. 604-394.000.
Tews, Richard R., 4,872,933, Cl. 156-184.000.

Kimura, Akiyoshi: *See*—
Sasaki, Nobukazu; Kasamura, Toshirou; Ohashi, Masashi; Okuda, Naoki; Kusumoto, Toshihiko; Maeda, Yasunori; Ozawa, Takashi; Yamamoto, Yasuyoshi; Kubota, Atsushi; Kimura, Akiyoshi; and Masuda, Makoto, 4,873,547, Cl. 355-316.000.

Kimura, Isao: *See*—
Kaji, Kichiro; Shimasaki, Katsunori; Yamamoto, Masakazu; Saiki, Kozo; Yura, Keita; Habata, Hidetsugu; Kimura, Isao; and Suzuki, Tetsuo, 4,873,070, Cl. 423-345.000.

Kimura, Katsutaka: *See*—
Etoh, Jun; Shimohigashi, Katsuhiro; Miyazawa, Kazuyuki; Kimura, Katsutaka; and Akiba, Takesada, 4,873,672, Cl. 365-218.000.

Kimura, Kiyoshi; Ueda, Fusao; and Ogasawara, Takashi, to Nippon Shinyaku Co., Ltd. 2,4-diamino-6-substituted-phenyl-S-triazines as nootropic agents. 4,873,242, Cl. 514-242.000.

Kimura, Naomasa, to Honda Giken Kogyo Kabushiki Kaisha. Mechanical quantity sensor element. 4,872,350, Cl. 73-779.000.

Kimura, Shinichiro: *See*—
Kaga, Toru; Kimura, Shinichiro; Kure, Tokuo; Kawamoto, Yoshifumi; and Sunami, Hideo, 4,873,203, Cl. 437-67.000.
Sunami, Hideo; Kimura, Shinichiro; and Kaga, Toru, 4,873,560, Cl. 357-23.600.

Kimura, Takashi; Yatomi, Toshiya; and Edakubo, Hiroo, to Canon Kabushiki Kaisha. Tape loading device having pair of tape guide post units on pair of rotatable members. 4,873,591, Cl. 360-85.000.

Kimura, Tsutomu; and Watanabe, Yukio, to Fuji Photo Film Co., Ltd. Method of and apparatus for recording and reading out radiation image information. 4,873,441, Cl. 250-327.200.

Kimura, Yoshio: *See*—
Okamoto, Shosuke; Okada, Yoshio; Okunomiya, Akiko; Naito, Taketoshi; Kimura, Yoshio; Yamada, Morihiko; Ohno, Norio; Katsuura, Yasuhiro; Nojima, Hiroshi; and Shishikura, Takashi, 4,873,253, Cl. 514-352.000.

King, Stephen W., to Union Carbide Corporation. Heterogeneous alkoxylation using anion-bound metal oxides. 4,873,017, Cl. 252-183.110.

Kinney, William A.; and Lee, Nancy E., to American Home Products Corporation. 2-Pyridinecarbothioamides and pharmaceutical compositions comprising the same. 4,873,238, Cl. 514-227.800.

Kino, Gordon S.: *See*—
Risk, William P.; and Kino, Gordon S., 4,872,738, Cl. 350-96.290.

Kinoshita, Masahide: *See*—
Tajima, Hatsuo; Hosoi, Atsushi; Hoshika, Norihisa; Tajika, Hiroshi; and Kinoshita, Masahide, 4,873,551, Cl. 355-251.000.

Kinoshita, Mitsuo; Ito, Tetsuo; Mikawa, Hiroji; and Chino, Koichi, to Hitachi, Ltd. Method and apparatus for controlling centrifugal thin film dryer. 4,872,948, Cl. 159-6.200.

Kinosky, David S., to Minnesota Mining and Manufacturing Company. Corrosion resistant silver and copper surfaces. 4,873,139, Cl. 428-341.000.

Kioritz Corporation: *See*—
Nagai, Noboru; Hashimoto, Yoshisato; Tsuboike, Yoshihiko; and Kaito, Noboru, 4,872,308, Cl. 60-316.000.

Kirker, Garry W.: *See*—
Absil, Robert P. L.; Angevine, Philip J.; Chester, Arthur W.; and Kirker, Garry W., 4,873,216, Cl. 502-211.000.

Kishi, Yuji: *See*—
Ishizaka, Yoshirou; Naganuma, Hiroshi; Sato, Kenji; Kishi, Yuji; Ishida, Yoshihisa; and Goto, Kiyokazu, 4,872,320, Cl. 62-255.000.

Kiszelly, Eniko : *See*—
Petocz, Lujza; Simonyi, Istvan; Beck, Ivan; Gigler, Gabor; Fekete, Marton; Kiszelly, Eniko ; Mandi, Attila; Gorgenyi, Frigyes; Dietz, Andras; Sumeg nee Zukovics, Katalin; and Jakfalvi, Elemer, 4,873,249, Cl. 514-275.000.

Kita, Akio, to Oki Electric Industry Co., Ltd. MIS FET and process of fabricating the same. 4,873,557, Cl. 357-23.100.

Kitagawa Industries Co., Ltd.: *See*—
Matsui, Kazuhiro, 4,873,505, Cl. 336-92.000.

Kitayama, Hidehiro. Eye mask. 4,872,217, Cl. 2-15.000.

Kitsukawa, Goro: *See*—
Hori, Ryoichi; Itoh, Kiyoo; Kitsukawa, Goro; Kawajiri, Yoshiki; Watanabe, Takao; and Kawahara, Takayuki, 4,873,673, Cl. 365-230.060.

Kiyoshige, Masanori: *See*—
Yasukawa, Wataru, deceased; Kiyoshige, Masanori; Horikawa, Takeshi; Okada, Tomonobu; Ochi, Tadafumi; Aoki, Yoshiaki; Higashida, Masahiko; Kawashima, Takashi; Koe, Shigeki; Ono, Hideo; Nihei, Kanta; Takasugi, Syunji; and Take, Koji, 4,872,293, Cl. 51-410.000.

Klatt, Robert W., to Hughes Aircraft Company. Method and apparatus for scanning thermal images. 4,873,442, Cl. 250-334.000.

Klaus Heckmann: *See*—
Heckmann, Klaus; Manecke, Georg; Pfannenmuller, Beate; Ring, Klaus; and Ringsdorf, Helmut, 4,873,033, Cl. 264-41.000.

Klein Tools Corporation: *See*—
Theros, Brian S., 4,872,551, Cl. 206-349.000.

Kleinberg, Leonard L., to United States of America, Administrator, National Aeronautics and Space Administration. Reflection oscillators employing series resonant crystals'. 4,873,498, Cl. 331-116.0FE.

Klemic, Frank, Jr. Concrete anchor bolt setting device. 4,872,298, Cl. 52-127.100.

Klemmensen, Ramon L., to Amana Refrigeration, Inc. Shut-off mechanism for ice maker. 4,872,318, Cl. 62-137.000.

Klockner Ferromatik Desma GmbH: *See*—
Landwehr, Reinhard; and Rebers, Gunter, 4,873,049, Cl. 264-513.000.

Kluge, Heinz: *See*—
Hammann, Peter; Grabley, Susanne; Raether, Wolfgang; Ciommer, Bernd; Kluge, Heinz; and Sachse, Burkhard, 4,873,347, Cl. 549-267.000.

Knapp, Karl E.: *See*—
Elias, Eric; and Knapp, Karl E., 4,873,118, Cl. 427-39.000.

Knapp, Malcolm H., to General Electric Company. Bearing support. 4,872,767, Cl. 384-99.000.

Knepper, James A., to International Business Machines Corporation. Roll release mechanism. 4,872,661, Cl. 271-273.000.

Knierim, Daniel G.: *See*—
Olisar, Ronald A.; and Knierim, Daniel G., 4,873,456, Cl. 307-272.100.

Knoblock, Glenn A.; and Scolten, Brian L., to Steelcase Inc. Slip connector for weight actuated height adjustors. 4,872,635, Cl. 248-406.200.

Ko, Kenneth K.: *See*—
Eshleman, James M.; and Ko, Kenneth K., 4,872,910, Cl. 106-3.000.

Ko, Wai-Shing: *See*—
Young, William A.; Ko, Wai-Shing; Davidson, Curtis R.; and Whitehurst, Thomas, 4,873,469, Cl. 315-155.000.

Koa Oil Company, Limited Director General, Agency of Industrial Science Technology: *See*—
Yamada, Yasuhiro; Imamura, Takeshi; Honda, Hidemasa; Fujii, Masaki; and Minohata, Masanori, 4,873,071, Cl. 423-448.000.

Kobashi, Toshiyuki; and Naka, Hideo, to Japan Exlan Company Limited. Transparent aqueous tin compound solution. 4,873,352, Cl. 556-105.000.

Kobayashi, Chuzo: *See*—
Higuchi, Noboru; Matsui, Keizo; Kobayashi, Chuzo; and Yamaguchi, Shigeru, 4,872,763, Cl. 366-160.000.

Kobayashi, Fumiuki: *See*—
Satoh, Motohiro; Yamada, Toshihiro; Kohono, Akiomi; Yamamoto, Akihiko; Taguchi, Keiji; Daikoku, Takahiro; and Kobayashi, Fumiuki, 4,872,606, Cl. 228-121.000.

Kobayashi, Hirokazu; Miyamoto, Yukihiko; Takai, Masaoki; Fujisawa, Syuichi; and Miyazawa, Hiroshi, to Trio Kabushiki Kaisha; and Nippon Hoso Kyokai. Method and apparatus for multiplexing of input signals having differing frequencies and demultiplexing same. 4,873,684, Cl. 370-102.000.

Kobayashi, Hiroo; Fujino, Hitoshi; Yagi, Tadashi; Adachi, Nobukazu; Hayakawa, Yasuyoshi; and Setoriyama, Takeshi, to Canon Kabushiki Kaisha. Image forming apparatus comprising a main assembly having a top frame adapted to swing open and closed with respect to a

bottom frame and having process cartridge detachably mounted in the main assembly. 4,873,548, Cl. 355-200.000.

Kobayashi, Hiroshi; Kobayashi, Masae; and Machida, Haruhiko, to Techno-Frontier Ltd. Cooking utensil. 4,872,445, Cl. 126-376.000.

Kobayashi, Hiroya: *See*—
Tsubakimoto, Tsuneo; Ito, Hayami; Tatsumi, Shuhei; Kajibata, Yoshihiro; Takao, Shoichi; Goto, Takakiyo; Nakaishi, Akio; Rakutani, Kenji; Tamura, Toshio; and Kobayashi, Hiroya, 4,872,885, Cl. 44-51.000.

Kobayashi, Koji, to Kowa Company Ltd. Light beam deflector. 4,872,746, Cl. 350-358.000.

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Saen, Haruo; and Kobayashi, Kougi, 4,873,411, Cl. 219-93.000.

Kobayashi, Masaaki; Yamanishi, kazuhiro; Takeuchi, Akihiro; and Nagaoka, Yoshitomi, to Matsushita Electric Industrial Co., Ltd. Magnetic tape recording/reproducing apparatus. 4,873,583, Cl. 358-310.000.

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Kobayashi, Masao: *See*—
Inoue, Kazutaka; Sato, Toshihiro; and Kobayashi, Masao, 4,873,391, Cl. 585-639.000.

Kobayashi, Takashi: *See*—
Tanaka, Yukitaka; Omura, Hisao; Irinatsu, Yuuichi; Kobayashi, Takashi; and Noguchi, Aiko, 4,873,109, Cl. 426-607.000.

Kobayashi, Yasuhito: *See*—
Iwase, Yoshiki; and Kobayashi, Yasuhito, 4,873,581, Cl. 358-310.000.

Kobayashi, Yoshihiko: *See*—
Umezawa, Sumio; Tsuchiya, Tsutomu; Takeuchi, Tomio; Umezawa, Kazuo; Takahashi, Yoshiaki; Shitara, Tetsuo; Kobayashi, Yoshihiko; and Takagi, Yasushi, 4,873,225, Cl. 514-41.000.

Kobayashi, Yuichi: *See*—
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Arthurs, Edward; Goodman, Matthew S.; Kobrinski, Haim; and Vecchi, Mario P., 4,873,681, Cl. 370-3.000.

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Krause, Hans; Ross, Rudi; and Koch, Helmut, 4,872,769, Cl. 384-226.000.

Koe, Shigeki: *See*—
Yasukawa, Wataru, deceased; Kiyoshige, Masanori; Horikawa, Takeshi; Okada, Tomonobu; Ochi, Tadafumi; Aoki, Yoshiaki; Higashida, Masahiko; Kawashima, Takashi; Koe, Shigeki; Ono, Hideo; Nihei, Kanta; Takasugi, Syunji; and Take, Koji, 4,872,293, Cl. 51-410.000.

Koenig, Horst: *See*—
Rossy, Philip A.; Thyes, Marco; Franke, Albrecht; Koenig, Horst; Lehmann, Hans D.; Gries, Josef; Friedrich, Ludwig; and Lenke, Dieter, 4,873,246, Cl. 514-252.000.

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Schild, Ronald H.; Koeplin-Gall, Sandra; and Broxterman, Gregory C., 4,872,999, Cl. 210-754.000.

Koese, Gerrit C. Multi-spindel drilling machine. 4,872,788, Cl. 408-46.000.

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Koh, Makoto: *See*—
Nakagawa, Kazushige; Koh, Makoto; Sera, Kyoji; Ozeki, Tadashi; and Iwasaki, Masahiro, 4,872,394, Cl. 91-506.000.

Kohara, Hidekatsu: *See*—
Tanaka, Hatsuyuki; Sato, Yoshiyuki; Kohara, Hidekatsu; and Nakayama, Toshimasa, 4,873,177, Cl. 430-326.000.

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Kohono, Akiomi: *See*—
Satoh, Motohiro; Yamada, Toshihiro; Kohono, Akiomi; Yamamoto, Akihiko; Taguchi, Keiji; Daikoku, Takahiro; and Kobayashi, Fumiuki, 4,872,606, Cl. 228-121.000.

Koizumi, Kiyoshi: *See*—
Okabe, Yoshimi; Iwamoto, Keiichi; Torichigai, Masaaki; Kaneko, Shozo; Ichinari, Joji; and Koizumi, Kiyoshi, 4,872,347, Cl. 73-634.000.

Koizumi, Tatsuya: *See*—
Onodera, Kagetoshi; Koizumi, Tatsuya; Kato, Toshiyuki; Sotani, Junji; Momo, Masauki; and Furuya, Shuichi, 4,873,127, Cl. 427-376.800.

Kojima, Yoshitaka: *See*—
Doi, Masayuki; Asahi, Naotatsu; Kojima, Yoshitaka; Kanamaru, Hisanobu; and Aoyama, Susumu, 4,873,150, Cl. 428-627.000.

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Komine, Isamu: *See*—
Miyazaki, Takao; Yamada, Yoshiro; and Komine, Isamu, 4,872,758, Cl. 356-381.000.

Komiya, Hirokazu: *See*—
Sonoda, Hidefumi; Mori, Eiji; Kawase, Mitsuo; Yoneshige, Kazuhiro; Takahashi, Akira; Komiya, Hirokazu; and Tanaka, Akira, 4,872,439, Cl. 123-518.000.

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Matsuda, Toshiharu; Sasakawa, Atsushi; Hayashi, Shoichiro; and Konai, Yutaka, 4,873,366, Cl. 562-416.000.

Kondo, Hiroyuki: *See*—
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Kondraske, George V., to Board of Regents, The University of Texas System. Sensor conditioning method and apparatus. 4,873,655, Cl. 364-553.000.

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Konica Corporation: *See*—
Hattori, Tsuyoshi; Tanaka, Masanao; and Matsuzaka, Syoji, 4,873,576, Cl. 358-224.000.
Nakayama, Haruki, 4,873,542, Cl. 354-400.000.
Tachibana, Kimie; Kaneko, Yutaka; and Ishii, Fumio, 4,873,183, Cl. 430-550.000.

Kono, Koichi; Okamoto, Kenkichi; Iwasaki, Rumi; and Sawada, Shuichi, to Toa Nenryo Kogyo Kabushiki Kaisha. Process for producing microporous ultra-high-molecular-weight polyolefin membrane. 4,873,034, Cl. 264-41.000.

Konopka, Richard O. Medication dispenser. 4,872,591, Cl. 221-3.000.

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Tsuruoka, Michihiko; Nakagawa, Wataru; Miyoshi, Noriomi; Konosu, Naohiro; and Hashimoto, Tadao, 4,872,335, Cl. 73-30.000.

Kopecki, Denis S., to Eastman Christensen Company. Drill string drill collars. 4,872,519, Cl. 175-320.000.

Kopf, Thomas W., to Master Products Inc. Safety tray. 4,872,723, Cl. 297-216.000.

Kopsch, Reiner; Gosswein, Claus F.; Lutz, Henning; Ball, Michael; and Hubert, Peter, to Ergo Forschungsgesellschaft mbH. Process for separating and producing chlorogenic acid. 4,872,987, Cl. 210-635.000.

Korea Advanced Institute of Science and Technology: *See*—
Jung, Il Nam; Hwang, Sang Yo; and Lee, Chung Suk, 4,873,011, Cl. 252-75.000.
Kim, In O.; and Lee, Sang G., 4,873,363, Cl. 568-319.000.

Kornfeld, Gertrude H., to United States of America, Army. Method for simulating an image by correllation. 4,873,657, Cl. 364-578.000.

Korsunsky, Iosif; Walker, Kevin E.; and Brown, Robert W., to AMP Incorporated. Retention means for chip carrier sockets. 4,872,845, Cl. 439-70.000.

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Kossmehl, Gerhard: *See*—
Scheer, Wolfgang; Fuhrmann, Hartmut; Kossmehl, Gerhard; Niemitz, Matthias; and Kabbeck-Kupijai, Detlef, 4,872,962, Cl. 204-224.00R.

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Kemper, Nicolaas R.; Bouwens, Henricus J. J.; Koster, Marinus P.; and De Peuter, Willem L. G., 4,872,362, Cl. 74-479.000.

Kotani, Haruo; and Tomita, Katsuhiko, to Horiba, Ltd. Methods of measuring ion-concentration and the like and a calibrating sheet as well as a calibrating method of measuring devices used therein. 4,872,956, Cl. 204-1.00T.

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Kageyama, Hidehei; Mitsuya, Yoshihide; and Nakazato, Yoichi, 4,872,776, Cl. 401-65.000.

Koutsoukos, Elias P., to TRW Inc. Carbonaceous material for production of hydrogen from low heating value fuel gases. 4,873,214, Cl. 502-185.000.

Kouyama, Toshitaka: *See*—
Satake, Yoshikatsu; Iizuka, Yo; Kouyama, Toshitaka; Katto, Takayuki; and Shiiki, Zenya, 4,873,283, Cl. 524-520.000.

Kowa Co, Ltd.: *See*—
Arai, Koichi; and Yoshizaki, Hideo, 4,873,222, Cl. 514-21.000.
Kobayashi, Koji, 4,872,746, Cl. 350-358.000.

Kowshik, Vikram; Boddu, Sudhakar; and Lucero, Elroy M., to National Semiconductor Corporation. Sequential read access of serial memories with a user defined starting address. 4,873,671, Cl. 365-189.120.

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Ueno, Hiroshi; Satomi, Tomoaki; and Yoshida, Teruo, 4,872,771, Cl. 384-492.000.

Kozawa, Tadashi: *See*—
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Kozuki, Susumu: *See*—
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Kranz, David M.: *See*—
Saito, Haruo; Kranz, David M.; Eisen, Herman N.; and Tonegawa, Susumu, 4,873,190, Cl. 435-172.300.

Krause, Hans; Ross, Rudi; and Koch, Helmut, to Leybold Aktiengesellschaft. Friction bearing system for a rapidly rotating shaft. 4,872,769, Cl. 384-226.000.

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Medley, Jackson C., 4,872,702, Cl. 280-708.000.

Krishnan, Sivaram: *See*—
Lundy, Charles E.; and Krishnan, Sivaram, 4,873,271, Cl. 523-136.000.

Kronauge, James: *See*—
Jones, Alun G.; Davison, Alan; Kronauge, James; and Abrams, Michael J., 4,872,561, Cl. 206-569.000.

Kruger, Bernd-Wieland; Sasse, Klaus; Hoever, Franz-Peter; Nentwig, Gunther; and Berhrenz, Wolfgang, to Bayer Aktiengesellschaft. Acylated aminoalcohols for repelling insects and mites. 4,873,252, Cl. 514-315.000.

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Kaiser, Carl; Kruse, Lawrence I.; and Ross, Stephen T., 4,873,357, Cl. 558-414.000.

KTX Co., Ltd.: *See*—
Noda, Yasuyoshi, 4,872,827, Cl. 425-526.000.

Kubicko, Robert E.: *See*—
Johnson, Paul D.; Kubicko, Robert E.; Martone, Louis C.; and Moores, Gregory E., 4,872,402, Cl. 99-280.000.

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Yoshida, Katsuhira; and Kubo, Yuji, 4,873,332, Cl. 546-7.000.

Kubodera, Seiiti; and Nakamine, Takeshi, to Fuji Photo Film Co., Ltd. Heat-sensitive transfer material. 4,873,220, Cl. 503-227.000.

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Sasaki, Nobukazu; Kasamura, Toshirou; Ohashi, Masashi; Okuda, Naoki; Kusumoto, Toshihiko; Maeda, Yasunori; Ozawa, Takashi; Yamamoto, Yasuyoshi; Kubota, Atsushi; Kimura, Akiyoshi; and Masuda, Makoto, 4,873,547, Cl. 355-316.000.

Kubota, Ltd.: *See*—
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Ikebuchi, Iwao; Nakano, Mamoru; Fuse, Kazuo; and Ganze, Akira, 4,872,973, Cl. 209-144.000.

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Kuchel, Michael, to Carl-Zeiss-Stiftung. Interferometer for measuring optical phase differences. 4,872,755, Cl. 356-360.000.

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Kuehn, Hans, to Bomag-Menck GmbH. Drive unit for driving ramming parts under water. 4,872,514, Cl. 173-132.000.

Kuge, Toru: *See*—
Ishii, Takaaki; and Kuge, Toru, 4,873,714, Cl. 379-88.000.

Kuhl, Peter: *See*—
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Kuhn, Manfred: *See*—
Springer, Hartmut; Kuhn, Manfred; and Buch, Holger M., 4,873,320, Cl. 534-632.000.

Kuhn, Matthaus: *See*—
Roemer, Erich; Kuhn, Matthaus; and Maurer, Leonhard, 4,872,248, Cl. 29-149.5DP.

Kuhn, Michael H.; Helzel, Thomas; Proksa, Roland; and Van Den Berg, Noel J. M., to U.S. Philips Corp. Magnetic resonance spectrometer. 4,873,486, Cl. 324-307.000.

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Hecht, Hans; and Kuhnt, Winfried, 4,873,490, Cl. 328-3.000.

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Kumada, Masaharu; and Misumi, Akira, to Hitachi, Ltd. Method of producing shadow mask of color cathode ray tube. 4,872,924, Cl. 148-12.100.

Kumagi, Shoji: *See*—
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Kaga, Toru; Kimura, Shinichiro; Kure, Tokuo; Kawamoto, Yoshifumi; and Sunami, Hideo, 4,873,203, Cl. 437-67.000.

Kureha Kagaku Kogyo K.K.: *See*—
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Uchida, Mitsuru; Yasuda, Satoshi; and Kuribayashi, Tetsuya, 4,873,185, Cl. 430-903.000.

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Iizuka, Nobuyuki; Kumata, Kazuhiko; and Kuroda, Michio, 4,872,312, Cl. 60-760.000.

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Sasaki, Nobukazu; Kasamura, Toshirou; Ohashi, Masashi; Okuda, Naoki; Kusumoto, Toshihiko; Maeda, Yasunori; Ozawa, Takashi; Yamamoto, Yasuyoshi; Kubota, Atsushi; Kimura, Akiyoshi; and Masuda, Makoto, 4,873,547, Cl. 355-316.000.

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Kuwabara, Takasi; Yoshiji, Takeo; and Tegawa, Masao, to Honda Giken Kogyo Kabushiki Kaisha. Method of and apparatus for automatically coating a workpiece. 4,872,417, Cl. 118-411.000.

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Kvalnes, Donovan E.: *See*—
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Kwestroo, Wim: *See*—
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Kwon, Hisung, to Sam Sung Electronic Co. Ltd. Power source switching circuit. 4,873,454, Cl. 307-140.000.

Labedz, Gerald P.: *See*—
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Vinas, Antonio B., 4,873,223, Cl. 514-23.000.

LaBounty, Roy E. Heavy duty plate shear. 4,872,264, Cl. 30-210.000.

LaCourse, William C.; and Akhtar, Maysood, to Alfred University. Process for strengthening glass. 4,872,896, Cl. 65-30.140.

Lafferty, Donald L. Coupling network for improving conversion efficiency of photovoltaic power source. 4,873,480, Cl. 323-229.000.

LaFitte, Larry L.: *See—*
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LaGesse, Michael F.; and LaGesse, Sally. Automatic coffee maker. 4,872,403, Cl. 99-280.000.

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LaGesse, Michael F.; and LaGesse, Sally, 4,872,403, Cl. 99-280.000.

Lahti, Archie E.: *See—*
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L'Air Liquide, Societe Anonyme Pour l'Etude et l'Explanation des Procedes Georges Claude: *See—*
Rufin, Denis; and Hirase, Ikuo, 4,872,944, Cl. 156-626.000.

Lake, Connie, to S. Eisenberg & Co., Division of Creative Industries, Inc. 18 Cell egg carton with angled latch flap. 4,872,608, Cl. 229-2.5EC.

Lam, David C. S. Container. 4,872,574, Cl. 220-1.500.

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Moore, Robert R.; Lamb, Steve; and Wolf, Eugene M., 4,872,451, Cl. 128-92.0YF.

Lamby, Edward J.: *See—*
Foust, Donald F.; Lamby, Edward J.; Karas, Bradley R.; Dumas, William V.; and Jerabek, Elihu C., 4,873,136, Cl. 428-209.000.

Lamprecht, Ned L.; and Hawley, Clyde W., to Dollinger Corporation. Multi-stage gas-entrained liquid separator. 4,872,890, Cl. 55-323.000.

Land O'Lakes, Inc.: *See—*
Pischke, LaMonte D.; and Greene, Ralph J., 4,873,094, Cl. 426-43.000.

Landais, Yannick: *See—*
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Landham, Edward C., Jr.: *See—*
Altman, Ralph F.; Gooch, John P.; Dismukes, Edward B.; and Landham, Edward C., Jr., 4,872,887, Cl. 55-5.000.

Landis, H. Richard, to Landis Plastics, Inc. Container closure and assembly. 4,872,586, Cl. 220-307.000.

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Alexson, Charles E., 4,872,452, Cl. 128-92.0VJ.
Delprato, Ivano; and Baldassarri, Agostino, 4,873,182, Cl. 430-546.000.
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Rieder, Werner, 4,873,060, Cl. 422-135.000.
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Wyberg, Gregory R., 4,872,562, Cl. 206-631.300.
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Ishikawa, Takuma; Maruyama, Tadashi; Johdai, Akiyoshi; Ishiguro, Kuniaki; and Matsui, Toshio, 4,872,662, Cl. 271-290.000.
Ito, Masazumi, 4,873,431, Cl. 250-227.000.
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Mehnert, Walter, 4,873,518, Cl. 340-825.070.
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Hyodo, Kenji; Koezuka, Hiroshi; and MacDiarmid, Alan G., 4,873,556, Cl. 357-8.000.
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Mitsubishi Kasei Corporation: *See*—
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Nishinoiri, Hiroshi; Saikawa, Masahiko; Takaya, Yoshikazu; and Kanada, Euji, 4,873,170, Cl. 430-204.000.
Senga, Takao; Takaoka, Kazuchiyo; Yamamoto, Hirokazu; and Hashimoto, Takimi, 4,873,166, Cl. 430-137.000.
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Miura, Tohru; Nagata, Teruyuki; Okazaki, Koju; Furuya, Masayuki; and Nishida, Emiko, 4,873,374, Cl. 568-743.000.
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Miyamoto, Yukihiko: *See*—
Kobayashi, Hirokazu; Miyamoto, Yukihiko; Takai, Masaoki; Fujisawa, Syuichi; and Miyazawa, Hiroshi, 4,873,684, Cl. 370.102.000.
Miyasaka, Nobuaki; and Suga, Shuzo, to Fuji Photo Film Co., Ltd. Silver halide photographic material. 4,873,181, Cl. 430-523.000.
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Miyazaki, Akihiko; Nonami, Tetsuo; and Ikuno, Yuji, to Olympus Optical Co., Ltd. Electronic endoscope apparatus. 4,873,572, Cl. 358-98.000.

Miyazaki, Hiroya: *See*—
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Miyazaki, Noriyuki; and Matsuoka, Tetsunori, to Sanyo Electric Co., Ltd. Rechargeable battery. 4,873,160, Cl. 429-170.000.

Miyazaki, Takao; Yamada, Yoshiro; and Komine, Isamu, to NKK Corporation. Film thickness-measuring apparatus. 4,872,758, Cl. 356-381.000.

Miyazaki, Wasei; and Inoue, Yasuhiko, to Otsuka Pharmaceutical Co., Ltd. Pharmaceutical composition for treating ulcerative large intestinal disease. 4,873,261, Cl. 514-462.000.

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Kobayashi, Hirokazu; Miyamoto, Yukihiko; Takai, Masaoki; Fujisawa, Syuichi; and Miyazawa, Hiroshi, 4,873,684, Cl. 370-102.000.

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Mizunoya, Nobuyuki: *See*—
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Abail, Robert P. L.; Angevine, Philip J.; Chester, Arthur W.; and Kirker, Garry W., 4,873,216, Cl. 502-211.000.
Avidan, Amos A.; and Johnson, David L., 4,873,385, Cl. 585-415.000.
Avidan, Amos A.; and Johnson, David L., 4,873,389, Cl. 585-533.000.
Bowes, Emmerson, 4,872,968, Cl. 208-111.000.
Sharps, Gordon V., Jr.; and St. Phillips, Eric A., 4,872,942, Cl. 156-515.000.
Valyocsik, Ernest W.; Page, Nancy M.; and Chu, Cynthia T-W., 4,873,067, Cl. 423-279.000.

Mobilio, Dominick, to American Home Products Corporation. Substituted fused tetrahydrocarbazole acetic acid derivatives. 4,873,257, Cl. 514-410.000.

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Moehle, Stephen J.: *See*—
Mezei, Louis M.; Albom, Bradley S.; Coppock, Stan; Moehle, Stephen J.; Noorda, Brent S.; Widunas, Joseph T.; and Zeitlin, James A., 4,873,633, Cl. 364-413.080.

Mogi, Hiroyuki; and Ozawa, Kazuhisa, to Dai-ichi Seiko Kabushiki Kaisha. IC tester socket. 4,872,850, Cl. 439-264.000.

Moguilewsky, Martine: *See*—
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Mohler, Rick L.: *See*—
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Moore, Robert R.; Lamb, Steve; and Wolf, Eugene M. Glenohumeral ligament repair. 4,872,451, Cl. 128-92.0YF.

Moore, Scott E.: *See*—
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Moores, Gregory E.: *See*—
Johnson, Paul D.; Kubicko, Robert E.; Martone, Louis C.; and Moores, Gregory E., 4,872,402, Cl. 99-280.000.

Moran, Lyle E.; and Kaufman, Lawrence G., to Exxon Research and Engineering Company. Flow resistant asphalt paving binder. 4,873,275, Cl. 524-64.000.

Mori, Eiji: *See*—
Sonoda, Hidefumi; Mori, Eiji; Kawase, Mitsuo; Yoneshige, Kazuhiro; Takahashi, Akira; Komiya, Hirokazu; and Tanaka, Akira, 4,872,439, Cl. 123-518.000.

Mori, Hiroshi: *See*—
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Mori, Hiroyuki: *See*—
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Mori, Nobufumi; Katoh, Takayuki; Oikawa, Tetsuo; Harada, Yoshiyasu; and Miyahara, Junji, to Fuji Photo Film Co., Ltd.; and Jeol Ltd. Electron microscope image output method and apparatus. 4,873,440, Cl. 250-327.200.

Mori, Toshihiro: *See*—
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Mori, Yusuke: *See*—
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Morioka, Masataka: *See*—
Fujii, Susumi; Ishida, Hiromi; Morioka, Masataka; Saito, Akihiro; and van der Meer, Roelof, 4,873,276, Cl. 524-153.000.

Morishige, Yukio: *See*—
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Morishita, Masanobu, to NEC Home Electronics Ltd. Image projection apparatus. 4,872,750, Cl. 353-7.000.

Morishita, Masataka; Aikawa, Renji; Katsuragi, Shigeo; Yamamoto, Yoshiaki; and Sugimoto, Kenichi, to Toyo Jozo Company, Ltd. Suppository preparation having excellent absorption property. 4,873,087, Cl. 424-433.000.

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Morita, Hirokiyo: *See*—
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Morota, Makie; and Fukuda, Junichi, to Honda Giken Kogyo Kabushiki Kaisha. Collision detector for a vehicle. 4,873,452, Cl. 307-10.100.

Morris, Steven T.: *See*—
Kelly-Fry, Elizabeth; and Morris, Steven T., 4,872,346, Cl. 73-627.000.

Morton Thiokol, Inc.: *See*—
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Singer, Victor, 4,872,612, Cl. 239-265.190.

Moser, Manfred; Itgenshorst, Dieter; and Kutz, Johannes, to Eduard Kusters Maschinenfabrik GmbH & Co KG. Method and device for imprinting webs. 4,872,325, Cl. 68-200.000.

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Fisch, Kenneth D.; Lucas, Alfred R.; and Willard, David F., 4,873,520, Cl. 340-825.440.
Genrich, Thad J., 4,873,500, Cl. 332-104.000.
Kielmeyer, Ronald F., Jr., 4,873,497, Cl. 331-108.00B.
Myers, Donald O.; and Venclovas, Ruta J., 4,872,945, Cl. 156-627.000.
Roberts, Teddy P.; and Rozanski, Walter J., Jr., 4,873,711, Cl. 379-58.000.
Sibigtroth, James M., 4,873,624, Cl. 364-200.000.
Tan, William, 4,873,527, Cl. 343-718.000.

Mouissie, Bob, to Du Pont de Nemours, E. I., and Company. Cover for a multipoint connector. 4,872,848, Cl. 439-135.000.

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Mrozik, Helmut: *See*—
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Muchowski, Joseph M.; and Greenhouse, Robert, to Syntex (U.S.A.) Inc. Process for preparing 5-aroyl-1,2-dihydro-3H-pyrrolo[1,2-A]pyrrole-1,1-dicarboxylates. 4,873,340, Cl. 548-453.000.

Muggli, Imelda A., to Minnesota Mining and Manufacturing Company. Fluorochemical surfactants and process for preparing same. 4,873,020, Cl. 252-355.000.

Mukai, Junji: *See*—
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Mullay, John J., to Atlas Powder Company. Composite explosive utilizing water-soluble fuels. 4,872,929, Cl. 149-46.000.

Muller, Louis F.: *See*—
Kuntz, David H.; and Muller, Louis F., 4,872,465, Cl. 128-857.000.

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Multer, Thomas L., to Lifeprotech, Inc. Support & anchor escutcheon for sprinkler heads installed on pipe. 4,872,512, Cl. 169-51.000.

Munakata, Hirohide: *See*—
Haruta, Masahiro; Kuwae, Yoko; Munakata, Hirohide; Yuasa, Satoshi; and Sugawa, Etsuko, 4,873,178, Cl. 430-327.000.

Munchmeyer, Dietrich: *See*—
Ehrfeld, Wolfgang; Hagmann, Peter; Mohr, Jurgen; and Munchmeyer, Dietrich, 4,872,888, Cl. 55-16.000.

Munz, Volker: *See*—
Bantle, Manfred; Munz, Volker; Zackl, Bernd; Dietz, Matthias; and Armbrust, Eberhard, 4,872,372, Cl 74-710.500.

Murai, Katsumi; and Usui, Makoto, to Matsushita Electric Industrial Co., Ltd. Optical information recording disk and optical information recording disk apparatus. 4,873,679, Cl. 369-32.000.

Murakami, Harunori: *See*—
Sakurai, Kaoru; Murakami, Harunori; Mizukami, Hikaru; and Fujita, Kazuhisa, 4,873,532, Cl. 343-713.000.

Murakami, Yoshikazu: *See*—
Ohgihara, Takahiro; Murakami, Yoshikazu; Mizunuma, Yasuyuki; and Nakano, Hiroyuki, 4,873,496, Cl. 331-96.000.

Murata, Hiroyuki: *See*—
Wakabayashi, Minoru; Murata, Hiroyuki; Sugino, Yasuo; Yamao, Masanobu; and Nishikawa, Takao, 4,872,972, Cl. 209-143.000.

Murata Kikai Kabushiki Kaisha: *See*—
Azuma, Ichiro; Tokura, Seiichi; Nishimura, Shinichiro; and Seo, Hiroshi, 4,873,092, Cl. 424-499.000.
Katayama, Isao, 4,873,418, Cl. 219-121.600.

Murata, Moriyoshi, to Kabushiki Kaisha Toshiba. Endoscope with color correcting mechanism. 4,872,446, Cl. 128-6.000.

Murayama, Yasushi: *See*—
Hirose, Yoshihiko; Aoki, Tomohiro; Chiku, Kazuyoshi; Murayama, Yasushi; Uchida, Takashi; Matsuzawa, Kunihiko; and Kanekura, Kazunori, 4,873,541, Cl. 346-160.100.

Murphy, Bruce L.: *See*—
Schumacher, Doris P.; Murphy, Bruce L.; and Clark, Jon E., 4,873,335, Cl. 546-194.000.

Murphy, Mark A.; Smith, Brad L.; Aguilo', Adolfo; and Tau, Kwoliang D., to Hoechst Celanese Corporation. Process for making 1,3-diols from epoxides. 4,873,378, Cl. 568-867.000.

Murphy, Mark A., to Hoechst Celanese Corporation. Process for making 1,3-diols from epoxides. 4,873,379, Cl. 568-867.000.

Muto, Tetsuji: *See*—
Sato, Makoto; Shiraishi, Shuji; and Muto, Tetsuji, 4,873,639, Cl. 364-426.020.

Mutschlechner, Johann: *See*—
Wohlleben, Rudolf; and Mutschlechner, Johann, 4,873,534, Cl. 343-786.000.

Myer, Robert E., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Amplifier with modulated resistor gain control. 4,873,492, Cl. 330-86.000.

Myers, Clyde J.; Stephenson, Daniel L.; and Travieso, Ruben, to American Telephone and Telegraph Company, AT&T Bell Laboratories. Connector assembly having a latching mechanism. 4,872,736, Cl. 350-96.200.

Myers, Donald O.; and Venclovas, Ruta J., to Motorola Inc. Post seal etching of transducer diaphragm. 4,872,945, Cl. 156-627.000.

Myers, Ed: *See*—
Aidlin, Samuel S.; Aidlin, Stephen H.; Bailey, Russell O.; and Myers, Ed, 4,873,410, Cl. 219-56.100.

Myers, Robert A., to NCR Corporation. Programmable ultraviolet lamp control system. 4,873,470, Cl. 315-240.000.

Myers, Terrance L., to Ingersoll-Rand Company. Fluid-jet-cutting nozzle assembly. 4,872,615, Cl. 239-587.000.

Nabisco Brands, Inc.: *See*—
Banks, Lori; Busk, Grant C., Jr.; Chiang, Bin; and Thulin, Robert, 4,873,098, Cl. 426-94.000.
Cordera, Robert J., 4,873,103, Cl. 426-233.000.
Fazzolare, Richard D.; Szwerc, Joseph A.; and McFeaters, Rich, 4,873,093, Cl. 426-28.000.
Spiel, Albert A.; Roe, James; and Spanier, Henry C., 4,873,096, Cl. 426-72.000.

Nagahara, Kazuyuki: *See*—
Iimura, Yoshio; and Nagahara, Kazuyuki, 4,873,479, Cl. 320-2.000.

Nagai, Noboru; Hashimoto, Yoshisato; Tsuboike, Yoshihiko; and Kaito, Noboru, to Kioritz Corporation. Exhaust device for working machine. 4,872,308, Cl. 60-316.000.

Nagaishi, Hatsuo; Seimiya, Yasuo; Tamura, Hideyuki; Miwa, Hiromichi; Sanbuichi, Hiroshi; Uchida, Masaaki; and Takahata, Toshio, to Nissan Motor Company, Limited. Induction volume sensing arrangement for an internal combustion engine or the like. 4,873,641, Cl. 364-431.040.

Naganuma, Hiroshi: *See*—
Ishizaka, Yoshirou; Naganuma, Hiroshi; Sato, Kenji; Kishi, Yuji; Ishida, Yoshihisa; and Goto, Kiyokazu, 4,872,320, Cl. 62-255.000.

Nagaoka, Yoshitomi: *See*—
Kobayashi, Masaaki; Yamanishi, kazuhiro; Takeuchi, Akihiro; and Nagaoka, Yoshitomi, 4,873,583, Cl. 358-310.000.

Nagashima, Hideo: *See*—
Matsushita, Junichi; Saito, Hajime; and Nagashima, Hideo, 4,873,053, Cl. 419-11.000.

Nagata, Mitsuhiro; Hayashi, Tadashi; Hashimoto, Yoshinobu; and Nakamura, Kiyoshi, to Kabushiki Kaisha Toshiba. Holder for sealing member. 4,873,208, Cl. 501-89.000.

Nagata, Teruyuki: *See*—
Miura, Tohru; Nagata, Teruyuki; Okazaki, Koju; Furuya, Masayuki; and Nishida, Emiko, 4,873,374, Cl. 568-743.000.

Nagy, Ernest J. Applicator device. 4,872,411, Cl. 111-7.100.

Nagy, Neil F. Truck bed liners. 4,872,720, Cl. 296-39.100.

Naito, Kazuo: *See*—
Yoshikawa, Masato; Fukuura, Yukio; Akiyama, Setsuo; Nakamura, Makoto; Naito, Kazuo; and Honda, Toshio, 4,872,932, Cl. 156-151.000.

Naito, Taketoshi: *See*—
Okamoto, Shosuke; Okada, Yoshio; Okunomiya, Akiko; Naito, Taketoshi; Kimura, Yoshio; Yamada, Morihiko; Ohno, Norio; Katsuura, Yasuhiro; Nojima, Hiroshi; and Shishikura, Takashi, 4,873,253, Cl. 514-352.000.

Naka, Hideo: *See*—
Kobashi, Toshiyuki; and Naka, Hideo, 4,873,352, Cl. 556-105.000.

Nakada, Akio: *See*—
Kanehira, Katsuyaki; Takayama, Syuichi; Amano, Atsushi; Hibino, Hiroki; Uchiyama, Naoki; and Nakada, Akio, 4,872,458, Cl. 128-401.000.

Nakadozono, Hiroshi; and Mori, Yusuke, to Nissan Motor Company, Limited. Meter for a vehicle. 4,872,415, Cl. 116-288.000.

Nakagawa, Banri; and Nojima, Katsuyuki, to International Business Machines Corporation. Video display system for scrolling text in selected portions of a display. 4,873,514, Cl. 340-726.000.

Nakagawa, Ippei: *See*—
Matsui, Haruo; Nakagawa, Ippei; and Kato, Kiyotaka, 4,873,073, Cl. 423-617.000.

Nakagawa, Kazushige; Koh, Makoto; Sera, Kyoji; Ozeki, Tadashi; and Iwasaki, Masahiro, to Shimadzu Corporation. Bent axis type axial piston pump or motor. 4,872,394, Cl. 91-506.000.

Nakagawa, Wataru: *See*—
Tsuruoka, Michihiko; Nakagawa, Wataru; Miyoshi, Noriomi; Konosu, Naohiro; and Hashimoto, Tadao, 4,872,335, Cl. 73-30.000.

Nakahata, Kimio: *See*—
Yoshikawa, Masao; and Nakahata, Kimio, 4,872,418, Cl. 118-657.000.

Nakaishi, Akio: *See*—
Tsubakimoto, Tsuneo; Ito, Hayami; Tatsumi, Shuhei; Kajibata, Yoshihiro; Takao, Shoichi; Goto, Takakiyo; Nakaishi, Akio; Rakutani, Kenji; Tamura, Toshio; and Kobayashi, Hiroya, 4,872,885, Cl. 44-51.000.

Nakajima, Nobuyoshi, to Fuji Photo Film Co., Ltd. Radiation image read-out method and apparatus. 4,873,437, Cl. 250-327.200.

Nakajima, Toyohei: *See*—
Mieno, Toshiyuki; Nakajima, Toyohei; Okada, Yasushi; and Oono, Nobuyuki, 4,873,642, Cl. 364-431.060.

Nakamine, Takeshi: *See*—
Kubodera, Seiiti; and Nakamine, Takeshi, 4,873,220, Cl. 503-227.000.

Nakamori, Masaharu: *See*—
Satake, Tokuki; Sakai, Hiroshi; Nakatani, Hayami; Nakamori, Masaharu; and Ishibashi, Masaru, 4,873,156, Cl. 429-31.000.

Nakamura, Hironori; Yotsui, Toshiaki; Sato, Youichi; Umetsubo, Toshiaki; and Ohkawa, Hideo, to CALP Kogyo Kabushiki Kaisha. Combination roll. 4,872,247, Cl. 29-125.000.

Nakamura, Kazuharu; Mito, Yoshio; Nakanishi, Yutaka; Yamada, Toshihiko; Nakamura, Kenji; and Itoh, Kiyonobu, to Toyotomi Kogyo

Co., Ltd. Fire-extinguishing device for oil burner. 4,872,829, Cl. 431-33.000.

Nakamura, Kenji: *See*—
Nakamura, Kazuharu; Mito, Yoshio; Nakanishi, Yutaka; Yamada, Toshihiko; Nakamura, Kenji; and Itoh, Kiyonobu, 4,872,829, Cl. 431-33.000.

Nakamura, Kiyoshi: *See*—
Nagata, Mitsuhiro; Hayashi, Tadashi; Hashimoto, Yoshinobu; and Nakamura, Kiyoshi, 4,873,208, Cl. 501-89.000.
Tobita, Toshimitsu; Inaba, Hiromi; Yamazaki, Masachika; Suzuki, Masato; Morita, Yuzo; Kajiyama, Toshiki; Nakamura, Kiyoshi; and Yoneda, Kenji, 4,872,532, Cl. 187-121.000.

Nakamura, Makoto: *See*—
Yoshikawa, Masato; Fukuura, Yukio; Akiyama, Setsuo; Nakamura, Makoto; Naito, Kazuo; and Honda, Toshio, 4,872,932, Cl. 156-151.000.

Nakamura, Masatoshi, to Nissan Motor Company. Vehicular brake control system. 4,872,731, Cl. 303-93.000.

Nakamura, Noboru: *See*—
Fujita, Takashi; Hihara, Toshio; Kogure, Yoshio; Sekioka, Riyouichi; and Nakamura, Noboru, 4,872,881, Cl. 8-549.000.

Nakamura, Shigeru; Machida, Sadatsugi; and Toda, Tsuyoshi, to Hitachi, Ltd. Optical head and optical information processor using the same. 4,873,678, Cl. 369-13.000.

Nakamura, Shinichi: *See*—
Nohira, Hiroyuki; Kamei, Masanao; Nakamura, Shinichi; Yoshinaga, Kazuo; Kai, Mariko; and Katagiri, Kazuharu, 4,873,018, Cl. 252-299.010.

Nakamura, Susumu, to Fuji Jukogyo Kabushiki Kaisha. Transmission ratio control system for a continuously variable transmission. 4,872,377, Cl. 74-867.000.

Nakamura, Tadashi. Soft-metal made can body with squashing guides. 4,872,576, Cl. 220-83.000.

Nakanishi, Yutaka: *See*—
Nakamura, Kazuharu; Mito, Yoshio; Nakanishi, Yutaka; Yamada, Toshihiko; Nakamura, Kenji; and Itoh, Kiyonobu, 4,872,829, Cl. 431-33.000.

Nakano, Hiroyuki: *See*—
Ohgihara, Takahiro; Murakami, Yoshikazu; Mizunuma, Yasuyuki; and Nakano, Hiroyuki, 4,873,496, Cl. 331-96.000.

Nakano, Kinichiro: *See*—
Takeuchi, Mikio; Nakano, Kinichiro; Mitamura, Kenichi; and Tomoda, Takahisa, 4,873,530, Cl. 343-711.000.

Nakano, Mamoru: *See*—
Ikebuchi, Iwao; Nakano, Mamoru; Fuse, Kazuo; and Ganze, Akira, 4,872,973, Cl. 209-144.000.

Nakatani, Hayami: *See*—
Satake, Tokuki; Sakai, Hiroshi; Nakatani, Hayami; Nakamori, Masaharu; and Ishibashi, Masaru, 4,873,156, Cl. 429-31.000.

Nakayama, Haruki, to Konica Corporation. Auto-focus camera. 4,873,542, Cl. 354-400.000.

Nakayama, Toshimasa: *See*—
Tanaka, Hatsuyuki; Sato, Yoshiyuki; Kohara, Hidekatsu; and Nakayama, Toshimasa, 4,873,177, Cl. 430-326.000.

Nakazato, Ryoji, to G-C Dental Industrial Corp. Resinous compositions for denture base. 4,873,269, Cl. 523-115.000.

Nakazato, Yoichi: *See*—
Kageyama, Hidehei; Mitsuya, Yoshihide; and Nakazato, Yoichi, 4,872,776, Cl. 401-65.000.

Nakhamkin, Michael, to Gibbs & Hill, Inc. Retrofit of simple cycle gas turbines for compressed air energy storage application. 4,872,307, Cl. 60-39.020.

Nalco Chemical Company: *See*—
Allenson, Stephan J., 4,873,280, Cl. 524-437.000.
Schild, Ronald H.; Koeplin-Gall, Sandra; and Broxterman, Gregory C., 4,872,999, Cl. 210-754.000.

Nantt, Wolfgang: *See*—
Zimmermann, Gunther; Friedrich, Reinhard; Nantt, Wolfgang; and Weissert, Wolfgang, 4,872,587, Cl. 220-375.000.

Naoumidis, Aristides: *See*—
Struck, Bernd D.; Neumeister, Herbert; and Naoumidis, Aristides, 4,873,121, Cl. 427-77.000.

Napier, James J.; and Griffith, Ronald C., to Fisons Corporation. 2-amino-N-(2-phenylindan-2-yl)acetamides useful as anti-epileptics. 4,873,241, Cl. 514-237.800.

Narukawa, Kiyotada: *See*—
Komatsu, Masato; Baba, Isao; Mikami, Takashi; Narukawa, Kiyotada; and Kanai, Tsuyoshi, 4,873,288, Cl. 525-194.000.

Narukawa, Osamu: *See*—
Kaneshiki, Toshitaka; Narukawa, Osamu; Haneda, Tadayoshi; and Endo, Toshiyuki, 4,873,383, Cl. 570-211.000.

Nath, Gunther: *See*—
Kreitmair, Albert; and Nath, Gunther, 4,873,446, Cl. 250-492.100.

Nathan, Robert H.; and Hislop, Lawrence A., to NCR Corporation. Point of sale automatic back-up system and method. 4,873,631, Cl. 364-405.000.

National Research Development Corporation: *See*—
Lindsey, Kevin, 4,872,291, Cl. 51-166.00R.
Mansfield, Peter; and Chapman, Barry L. W., 4,873,503, Cl. 335-216.000.
Mitchell, Stephen W., 4,872,428, Cl. 123-90.170.
Nicholson, John W.; and Wilson, Alan D., 4,873,130, Cl. 428-35.800.
See, Chung W.; and Vaez-Iravani, Mehdi, 4,873,434, Cl. 250-235.000.

National Science Council: *See*—
Ma, Chen-chi M.; and Shih, Wen-cheng, 4,873,128, Cl. 427-434.700.

National Semiconductor Corporation: *See*—
Kowshik, Vikram; Boddu, Sudhakar; and Lucero, Elroy M., 4,873,671, Cl. 365-189.120.
Wong, Hee, 4,873,700, Cl. 375-76.000.

National Starch and Chemical Corporation: *See*—
Maliczyszyn, Walter; and Hernandez, Henry R., 4,872,951, Cl. 162-135.000.

Natsume, Naohiro: *See*—
Yamada, Yutaka; Kozawa, Tadashi; Natsume, Naohiro; and Komatsubara, Hirofumi, 4,872,806, Cl. 415-55.500.

NCR Corporation: *See*—
Jones, Jack E.; and Bulmahn, David J., 4,872,505, Cl. 165-80.300.
Myers, Robert A., 4,873,470, Cl. 315-240.000.
Nathan, Robert H.; and Hislop, Lawrence A., 4,873,631, Cl. 364-405.000.

NEC Corporation: *See*—
Matai, Masahiro; Ohyagi, Takashi; and Mori, Toshihiro, 4,873,519, Cl. 340-825.440.
Satoh, Yayoi; and Mizukami, Toshihiko, 4,873,724, Cl. 381-40.000.
Shibagaki, Kouichi; and Fukui, Akira, 4,873,723, Cl. 381-34.000.
Uesugi, Fumihiko; and Morishige, Yukio, 4,873,413, Cl. 219-121.680.

NEC Electronics Inc.: *See*—
Gerhard, Bruce; and Schulman, Bruce, 4,872,339, Cl. 73-204.140.

NEC Home Electronics Ltd.: *See*—
Morishita, Masanobu, 4,872,750, Cl. 353-7.000.

Nederlandse Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek TNO: *See*—
Van Wijk, Hendrik F., 4,872,990, Cl. 210-644.000.

Negishi, Kenji; Sasaki, Hidemi; and Fujishiro, Takeshi, to Fuji Photo Film Co., Ltd. Mechanism for supporting and guiding a head carriage. 4,873,598, Cl. 360-106.000.

Nelson, III: Alvin T.: *See*—
Cothran, Michael W.; and Nelson, III: Alvin T., 4,872,629, Cl. 248-231.200.

Nelson Industries Inc.: *See*—
Goplen, Gary D.; and Iles, Lawrence F., 4,872,528, Cl. 181-228.000.

Nelson, Jack R., to Triton Engineering Services Company. Flat bottom drilling bit with polycrystalline cutters. 4,872,520, Cl. 175-329.000.

Nelson, Linda H., to General Electric Company. Inhibition of irradiation yellowing in polysulfone compositions. 4,873,278, Cl. 524-380.000.

Nelson, Linda H., to General Electric Company. Copolyester-carbonate and polyester resin blends exhibiting improved color properties. 4,873,279, Cl. 524-384.000.

Nelson, Lloyd M.: *See*—
Boyer, Billy G.; Nelson, Lloyd M.; Soucie, Wayne L.; and Hayes, William K., 4,872,533, Cl. 188-2.00D.

Nelson, Loren D.; Erb, Lee A.; Ware, Randolph H.; and Rottner, Donald, to Radiometrics Corporation. Microwave radiometer and methods for sensing atmospheric moisture and temperature. 4,873,481, Cl. 324-58.50R.

Nemcovsky, Rhonda L.: *See*—
Jones, Gerald M.; and Nemcovsky, Rhonda L., 4,872,259, Cl. 29-764.000.

Nemo, Thomas E.: *See*—
Hagen, Gary P.; and Nemo, Thomas E., 4,873,386, Cl. 585-471.000.

Nemoto, Kenji: *See*—
Minagawa, Takehiro; Stou, Toshio; Miyata, Masao; Nemoto, Kenji; and Uchida, Kuninobu, 4,872,793, Cl. 409-244.000.

Nentwig, Gunther: *See*—
Kruger, Bernd-Wieland; Sasse, Klaus; Hoever, Franz-Peter; Nentwig, Gunther; and Berhrenz, Wolfgang, 4,873,252, Cl. 514-315.000.

Nerger, Klaus K., to Mannesmann Aktiengesellschaft. Support for a gripper for an industrial robot. 4,872,718, Cl. 294-86.400.

Nestle S.A.: *See*—
Smith, John M., 4,872,876, Cl. 623-6.000.

Neulinger, Franz; Schummer, Helmut; Donig, Gerhard; and Schmidt, Walter, to Metallgesellschaft AG; and Siemens AG. Voltage supply with recovery protection for a thyristor. 4,873,620, Cl. 363-57.000.

Neumann, Peter: *See*—
Schaefer, Gerhard; Eilingsfeld, Heinz; Neumann, Peter; and Stumpp, Michael, 4,873,372, Cl. 568-34.000.

Neumeister, Herbert: *See*—
Struck, Bernd D.; Neumeister, Herbert; and Naoumidis, Aristides, 4,873,121, Cl. 427-77.000.

Neun, John A.: *See*—
Watts, Robert J.; Rice, David A.; and Neun, John A., 4,872,337, Cl. 73-162.000.

Neupauer, Elfriede, to Siemens A.G. Method and apparatus for controlling a static converter at an asymetrical network. 4,873,619, Cl. 363-51.000.

Newkirk, Raymond K.; and Batzlaff, Richard L., to Forward Technology Industries, Inc. Apparatus and method for bonding a plastic container and spout. 4,872,935, Cl. 156-250.000.

Newman, Neil A.; Bankstahl, Herbert A.; Griffiths, John M.; Forsgren, Lyle M.; and Beck, Wayne T., to Brunswick Corporation. Operation optimizing system for a marine drive unit. 4,872,857, Cl. 440-1.000.

Newman, Neil A.: *See*—
Griffiths, John M.; Forsgren, Lyle M.; Newman, Neil A.; and Beck, Wayne T., 4,872,859, Cl. 440-53.000.

NGK Spark Plug Co., Ltd.: *See*—
Akao, Shigeaki; Ishida, Noboru; and Kawamura, Mitsuyoshi, 4,872,431, Cl. 123-188.0AA.
Matsumura, Shuzo; Mizuno, Takanori; Aoki, Noboru; and Suzuki, Takahire, 4,873,466, Cl. 313-131.00R.
Nichols, Donald H.: *See*—
Jensen, Richard E.; Nichols, Donald H.; and Hemphill, D. Gary, 4,873,193, Cl. 436-176.000.
Nichols, Raymond L. Apparatus for squat exercise. 4,872,670, Cl. 272-134.000.
Nicholson, John W.; and Wilson, Alan D., to National Research Development Corporation. Coating process for the preparation of coherent protective layer. 4,873,130, Cl. 428-35.800.
Nickason, Barry E.; and DiGirolamo, Orazio, to CCL Industries Inc. Recovery of propellant from aerosol can filling operation. 4,872,491, Cl. 141-20.000.
Niebylski, Leonard M., to Ethyl Corporation. Preceramic compositions and ceramic products. 4,873,353, Cl. 556-402.000.
Nielsen, Ernst P. F. Apparatus for cleaning medical hand instruments and implements for treatment of the hair, skin and/or body. 4,872,235, Cl. 15-104.920.
Niemeyer, Robert H., III, to AM International Corporation. Pen shuttle guide and spring return. 4,873,538, Cl. 346-139.00R.
Niemitz, Matthias: *See*—
Scheer, Wolfgang; Fuhrmann, Hartmut; Kossmehl, Gerhard; Niemitz, Matthias; and Kabbeck-Kupijai, Detlef, 4,872,962, Cl. 204-224.00R.
Nihei, Kanta: *See*—
Yasukawa, Wataru, deceased; Kiyoshige, Masanori; Horikawa, Takeshi; Okada, Tomonobu; Ochi, Tadafumi; Aoki, Yoshiaki; Higashida, Masahiko; Kawashima, Takashi; Koe, Shigeki; Ono, Hideo; Nihei, Kanta; Takasugi, Syunji; and Take, Koji, 4,872,293, Cl. 51-410.000.
Nihon Plast Co., Ltd.: *See*—
Minagawa, Takehiro; Stou, Toshio; Miyata, Masao; Nemoto, Kenji; and Uchida, Kuninobu, 4,872,793, Cl. 409-244.000.
Nihon Technical Kabushiki Kaisha: *See*—
Hatanaka, Ryousuke, 4,873,597, Cl. 360-105.000.
Nilsson, Mats; Tagesson, Bernt; and Novak, Ladislav, to Alfa-Laval Thermal AB. Gasket for plate heat exchanger. 4,872,506, Cl. 165-166.000.
Nippon ABS, Ltd.: *See*—
Arikawa, Tetsuro, 4,872,729, Cl. 303-92.000.
Nippon Hoso Kyokai: *See*—
Kobayashi, Hirokazu; Miyamoto, Yukihiko; Takai, Masaoki; Fujisawa, Syuichi; and Miyazawa, Hiroshi, 4,873,684, Cl. 370-102.000.
Nippon Mektron, Ltd.: *See*—
Kameda, Eiichi, 4,872,934, Cl. 156-250.000.
Nippon Oil Co., Ltd.: *See*—
Kajikawa, Teruo; and Yoshino, Toshio, 4,872,930, Cl. 156-72.000.
Nippon Seiko Kabushiki Kaisha: *See*—
Saito, Hiroyuki, 4,872,703, Cl. 280-804.000.
Nippon Sheet Glass Co., Ltd.: *See*—
Sakurai, Kaoru; Murakami, Harunori; Mizukami, Hikaru; and Fujita, Kazuhisa, 4,873,532, Cl. 343-713.000.
Nippon Shinyaku Co., Ltd.: *See*—
Kimura, Kiyoshi; Ueda, Fusao; and Ogasawara, Takashi, 4,873,242, Cl. 514-242.000.
Nippon Shokubai Kabaku Kogyo Co., Ltd.: *See*—
Tsubakimoto, Tsuneo; Ito, Hayami; Tatsumi, Shuhei; Kajibata, Yoshihiro; Takao, Shoichi; Goto, Takakiyo; Nakaishi, Akio; Rakutani, Kenji; Tamura, Toshio; and Kobayashi, Hiroya, 4,872,885, Cl. 44-51.000.
Nippon Shokubai Kagaku Kogyo Co., Ltd.: *See*—
Kawajiri, Tatsuya; Onodera, Hideo; Uchida, Shinichi; Aoki, Yukio; and Wada, Masahiro, 4,873,217, Cl. 502-311.000.
Nippon Steel Corporation: *See*—
Kawasaki, Yoshiki; Hioki, Yoshihiro; Ohno, Yuichi; Ichida, Kozaburo; Yamaguchi, Susumu; Sudo, Michitaka; and Chikazawa, Bunichiro, 4,872,245, Cl. 29-81.00A.
Nippondenso Co., Ltd.: *See*—
Takagi, Kozi; Ido, Noriyuki; Ohno, Sadayuki; Suzuki, Hideaki; Inoue, Yoshiaki; and Nomura, Yoshihisa, 4,872,730, Cl. 303-92.000.
Nishida, Emiko: *See*—
Miura, Tohru; Nagata, Teruyuki; Okazaki, Koju; Furuya, Masayuki; and Nishida, Emiko, 4,873,374, Cl. 568-743.000.
Nishida, Takeshi: *See*—
Umemoto, Mitsumasa; Asano, Tamotsu; Horie, Hironobu; Takagi, Akinobu; Tamura, Nobuyasu; and Nishida, Takeshi, 4,873,373, Cl. 568-637.000.
Nishihara, Takashi: *See*—
Shiraishi, Shuji; and Nishihara, Takashi, 4,873,638, Cl. 364-426.010.
Nishikawa, Takao: *See*—
Wakabayashi, Minoru; Murata, Hiroyuki; Sugino, Yasuo; Yamao, Masanobu; and Nishikawa, Takao, 4,872,972, Cl. 209-143.000.
Nishimura, Shinichiro: *See*—
Azuma, Ichiro; Tokura, Seiichi; Nishimura, Shinichiro; and Seo, Hiroshi, 4,873,092, Cl. 424-499.000.
Nishinoiri, Hiroshi; Saikawa, Masahiko; Takaya, Yoshikazu; and Kanada, Euji, to Mitsubishi Paper Mills, Ltd. Method for making lithographic printing plate. 4,873,170, Cl. 430-204.000.
Nishio, Kouji; and Hanamura, Yoshihiko, to Tokyo Kogaku Kikai Kabushiki Kaisha. Noncontact type tonometer. 4,872,460, Cl. 128-648.000.
Nishiyama, Hiromi: *See*—
Arai, Kunio; Nishiyama, Hiromi; Aoyama, Hiroshi; and Kanaya, Yasuhiko, 4,872,787, Cl. 408-1.00R.
Nishiyama, Tamotsu; and Kuninobu, Shigeo, to Matsushita Electric Industrial Co., Ltd. Arithmetic processor using redundant signed digit arithmetic. 4,873,660, Cl. 364-768.000.
Nishizono, Taiji, to K.K. Chibakou Shoji. Condom applicator. 4,872,463, Cl. 128-844.000.
Nissan Chemical Industries, Ltd.: *See*—
Kato, Etsuro, 4,873,064, Cl. 423-85.000.
Nissan Motor Company: *See*—
Nakamura, Masatoshi, 4,872,731, Cl. 303-93.000.
Nissan Motor Company, Limited: *See*—
Akatsu, Yohsuke; Fukushima, Naoto; Fukunaga, Yukio; Hano, Sunao; and Satoh, Masaharu, 4,872,701, Cl. 280-703.000.
Nagaishi, Hatsuo; Seimiya, Yasuo; Tamura, Hideyuki; Miwa, Hiromichi; Sanbuichi, Hiroshi; Uchida, Masaaki; and Takahata, Toshio, 4,873,641, Cl. 364-431.040.
Nakadozono, Hiroshi; and Mori, Yusuke, 4,872,415, Cl. 116-288.000.
Tabata, Toshiyuki; Ishiyama, Tatsuro; Ushijima, Takao; and Dan, Takuya, 4,872,650, Cl. 267-140.100.
Takeuchi, Mikio; Nakano, Kinichiro; Mitamura, Kenichi; and Tomoda, Takahisa, 4,873,530, Cl. 343-711.000.
Togo, Sigeru; Saito, Yoichi; Tateyama, Masayuki; Okuma, Genji; and Miyazaki, Hiroya, 4,873,475, Cl. 318-489.000.
Nisshin Steel Co., Ltd.: *See*—
Shinoda, Kenichi; Iwao, Tomoyoshi; Isayama, Tomoaki; and Higo, Yuichi, 4,873,149, Cl. 428-609.000.
Nitsch, Wilhelm: *See*—
Zahn, Wolfgang; Fursich, Manfred; Nitsch, Wilhelm; Rauh, Hans-Jurgen; and Treiber, Helmut, 4,873,546, Cl. 355-38.000.
Niwa, Katuhiro; Abe, Nobuyasu; Kajikiyo, Katuji; Suzuoki, Tsutomu; Tabuti, Katumi; and Arii, Yoshifumi, to Gunze Limited. Apparatus for cutting tubular knitted fabric. 4,872,383, Cl. 83-175.000.
Niwa, Takashi: *See*—
Honda, Sueaki; Hayashi, Mitsuji; Niwa, Takashi; Hayakawa, Akihiko; and Bingo, Hideyuki, 4,873,402, Cl. 200-283.000.
Nixdorf, Richard D.: *See*—
Weaver, Samuel C.; and Nixdorf, Richard D., 4,873,069, Cl. 423-345.000.
NKK Corporation: *See*—
Koshihara, Toshio; Misawa, Rokurou; Sagawa, Yuzo; Takehara, Kimio; Matoba, Yuji; and Ishihara, Koji, 4,872,762, Cl. 374-5.000.
Miyazaki, Takao; Yamada, Yoshiro; and Komine, Isamu, 4,872,758, Cl. 356-381.000.
Nobelpharma AB: *See*—
Brajnovic, Izidor, 4,872,839, Cl. 433-173.000.
Noble, Wendell P., Jr.: *See*—
Critchlow, Dale L.; DeBrosse, John K.; Mohler, Rick L.; Noble, Wendell P., Jr.; and Parries, Paul C., 4,873,205, Cl. 437-200.000.
Nocolaou, Kyriacos C.: *See*—
Abe, Yoshihiro; and Nocolaou, Kyriacos C., 4,873,024, Cl. 260-405.500.
Noda, Yasuyoshi, to KTX Co., Ltd. Porous die. 4,872,827, Cl. 425-526.000.
Noguchi, Aiko: *See*—
Tanaka, Yukitaka; Omura, Hisao; Irinatsu, Yuuichi; Kobayashi, Takashi; and Noguchi, Aiko, 4,873,109, Cl. 426-607.000.
Nohira, Hiroyuki; Kamei, Masanao; Nakamura, Shinichi; Yoshinaga, Kazuo; Kai, Mariko; and Katagiri, Kazuharu, to Canon Kabushiki Kaisha; and Yamakawa Yakuhin Kogyo Kabushiki Kaisha. Optically active compound, process for producing same and liquid crystal composition containing same. 4,873,018, Cl. 252-299.010.
Nojima, Hiroshi: *See*—
Okamoto, Shosuke; Okada, Yoshio; Okunomiya, Akiko; Naito, Taketoshi; Kimura, Yoshio; Yamada, Morihiko; Ohno, Norio; Katsuura, Yasuhiro; Nojima, Hiroshi; and Shishikura, Takashi, 4,873,253, Cl. 514-352.000.
Nojima, Katsuyuki: *See*—
Nakagawa, Banri; and Nojima, Katsuyuki, 4,873,514, Cl. 340-726.000.
Nomura, Yoshihisa: *See*—
Takagi, Kozi; Ido, Noriyuki; Ohno, Sadayuki; Suzuki, Hideaki; Inoue, Yoshiaki; and Nomura, Yoshihisa, 4,872,730, Cl. 303-92.000.
Nonami, Tetsuo: *See*—
Miyazaki, Akihiko; Nonami, Tetsuo; and Ikuno, Yuji, 4,873,572, Cl. 358-98.000.
Nonini, Geremia, to Danieli & C. Officine Meccaniche SpA. Plant for straightening and cutting to length rolled sections or bars. 4,872,330, Cl. 72-131.000.
Noonan, Edward B.: *See*—
Dong, Dennis F.; Noonan, Edward B.; Rogers, Derek J.; Clifford, Arthur L.; Benesch, Katharina; and Loftfield, Richard E., 4,872,957, Cl. 204-84.000.
Noorda, Brent S.: *See*—
Mezei, Louis M.; Albom, Bradley S.; Coppock, Stan; Moehle, Stephen J.; Noorda, Brent S.; Widunas, Joseph T.; and Zeitlin, James A., 4,873,633, Cl. 364-413.080.
Nordby, Rasmus: *See*—
Crandall, Douglas; Cavanna, Vicente; Shankar, Pradip; and Nordby, Rasmus, 4,873,703, Cl. 375-118.000.
Norden, Alexander R., to Connectron, Inc. Adjustable terminal block equipment. 4,872,855, Cl. 439-717.000.

Noren, Tore H., to Hobart Corporation. Low energy, low water consumption warewasher. 4,872,466, Cl. 134-57.00D.

Norling, Brian L.: *See*—
Hanson, Richard A.; Peters, Rex B.; Norling, Brian L.; and Urbach, Edward A., 4,872,342, Cl. 73-517.00R.

North American Philips Corporation: *See*—
Darby, Ted A., 4,873,574, Cl. 358-139.000.

Northern Telecom Limited: *See*—
Geadah, Youssef A.; and Lefebvre, Martin C., 4,873,667, Cl. 365-189.070.
Irwin, George F.; Smelters, Paul J.; Robertson, David J.; and Maginley, Ronald J., 4,873,682, Cl. 370-58.100.
Kahn: David A.; Pacey, Grant K.; Hvezda, Jaroslav M.; and Dalgleish, Jack F., 4,872,739, Cl. 350-96.160.
Lefebvre, Martin C.; Ciancibello, Carmine A.; and Geadah, Youssef A., 4,873,666, Cl. 365-189.070.
Williams, Robert J.; and Smith, Randall J., 4,872,824, Cl. 425-113.000.

Norton, John A.: *See*—
Boat, John L., 4,872,279, Cl. 42-90.000.

Novak, Ladislav: *See*—
Nilsson, Mats; Tagesson, Bernt; and Novak, Ladislav, 4,872,506, Cl. 165-166.000.

Nowakowsky, Bernhard H.; Beck, Juergen; Hartmann, Heinrich; and Vamvakaris, Christos, to BASF Aktiengesellschaft. Batchwise preparation of crosslinked, finely divided polymers. 4,873,299, Cl. 526-73.000.

Nozaki, Masahiro, to Toyoda Gosei Co., Ltd. Sealing structure for automobile. 4,872,288, Cl. 49-485.000.

Nunley, Alvin, III: *See*—
Bailey, James B.; Gibson, Robert R.; Nunley, Alvin, III; and Utz, Q. Wayne, 4,873,676, Cl. 367-98.000.

Nuraseal Co. Ltd.: *See*—
Drumm, Kevin R., 4,872,689, Cl. 277-9.500.

Nutt, Wendell G.: *See*—
Friesen, Harold W.; and Nutt, Wendell G., 4,873,393, Cl. 174-34.000.

O-I Brockway Glass, Inc.: *See*—
McCausland, Thomas W., 4,873,674, Cl. 65-374.120.

O.M.V. S.p.A. (Officine Meccaniche Veronesi): *See*—
Padovani, Pietro, 4,872,826, Cl. 425-388.000.

Occidental Chemical Corporation: *See*—
Miller, George T., 4,873,153, Cl. 428-659.000.

Occidential Chemical Corporation: *See*—
Danneis, Bobby F.; Olsen, Deborah J.; and Forcucci, John, 4,873,382, Cl. 570-177.000.

Ochi, Tadafumi: *See*—
Yasukawa, Wataru, deceased; Kiyoshige, Masanori; Horikawa, Takeshi; Okada, Tomonobu; Ochi, Tadafumi; Aoki, Yoshiaki; Higashida, Masahiko; Kawashima, Takashi; Koe, Shigeki; Ono, Hideo; Nihei, Kanta; Takasugi, Syunji; and Take, Koji, 4,872,293, Cl. 51-410.000.

O'Connor, Chadwell. Wheel-less walking dolly. 4,872,524, Cl. 180-8.600.

O'Connor, Chadwell. Locking tripod leg. 4,872,627, Cl. 248-168.000.

O'Connor, Chadwell. Mechanically counterbalancing platform. 4,872,628, Cl. 248-178.000.

Octel Communications Corp.: *See*—
Barnett, Paul M.; Welch, Douglas A.; and MacMillan, Duncan J., Jr., 4,873,718, Cl. 379-156.000.

ODL, Incorporated: *See*—
DeBlock, David A.; and Artwick, Kert E., 4,872,498, Cl. 160-90.000.

Ogasawara, Takashi: *See*—
Kimura, Kiyoshi; Ueda, Fusao; and Ogasawara, Takashi, 4,873,242, Cl. 514-242.000.

Ogata, Naoya; Sanui, Kohei; Yui, Nobuhiko; Kataoka, Kazunori; Okano, Teruo; and Sakurai, Yasuhisa, to Research Development Corporation of Japan. Antithrombogenic synthetic polymer and process for its preparation. 4,873,292, Cl. 525-408.000.

Ogawa, Takashi: *See*—
Wakamori, Takehisa; Ogawa, Takashi; Ito, Ryoji; and Shimanaka, Chikafumi, 4,872,257, Cl. 29-701.000.

Ogawa, Toshio; Fujii, Mituru; Asai, Tadamichi; Ikegami, Akira; Ohtsu, Hiroshi; and Ato, Kazuhiko, to Hitachi, Ltd. Electrically conductive paste, electronic circuit component and method for producing same. 4,873,022, Cl. 428-209.000.

Ogiso, Taro, to Maraho Co., Ltd. Percutaneous absorption preparation. 4,873,081, Cl. 424-81.000.

Oguri, Shigenori; and Terada, Kosei, to Yamaha Corporation. Automatic rhythm performing apparatus with modifiable correspondence between stored rhythm patterns and produced instrument tones. 4,872,385, Cl. 84-635.000.

O'Hare, Louis R. Fixation of nitrogen by solar energy. 4,873,061, Cl. 422-188.000.

Ohashi, Masashi: *See*—
Sasaki, Nobukazu; Kasamura, Toshirou; Ohashi, Masashi; Okuda, Naoki; Kusumoto, Toshihiko; Maeda, Yasunori; Ozawa, Takashi; Yamamoto, Yasuyoshi; Kubota, Atsushi; Kimura, Akiyoshi; and Masuda, Makoto, 4,873,547, Cl. 355-316.000.

Ohashi, Toshijiro: *See*—
Sato, Hiroshi; Ohashi, Toshijiro; Hamada, Toyohide; Umakoshi, Yukimori; Suzuki, Takamichi; Wada, Yuuji; Hara, Shigeo; and Fukumoto, Youshuke, 4,872,618, Cl. 242-4.00R.

Ohgihara, Takahiro; Murakami, Yoshikazu; Mizunuma, Yasuyuki; and Nakano, Hiroyuki, to Sony Corporation. Tuned oscillator. 4,873,496, Cl. 331-96.000.

Ohio University: *See*—
Wagner, Thomas E.; and Hoppe, Peter C., 4,873,191, Cl. 435-172.300.

Ohkawa, Hideo: *See*—
Nakamura, Hironori; Yotsui, Toshiaki; Sato, Youichi; Umetsubo, Toshiaki; and Ohkawa, Hideo, 4,872,247, Cl. 29-125.000.

Ohmine, Megumi: *See*—
Moriyasu, Masaharu; Morita, Takeshi; and Ohmine, Megumi, 4,873,417, Cl. 219-121.600.

Ohnishi, Tetsuya: *See*—
Suzuki, Yasumichi; Ikeda, Yoshinori; Katoh, Koichi; Ohnishi, Tetsuya; Kadowaki, Toshihiro; and Honma, Toshio, 4,873,570, Cl. 358-80.000.

Ohno, Norio: *See*—
Okamoto, Shosuke; Okada, Yoshio; Okunomiya, Akiko; Naito, Taketoshi; Kimura, Yoshio; Yamada, Morihiko; Ohno, Norio; Katsuura, Yasuhiro; Nojima, Hiroshi; and Shishikura, Takashi, 4,873,253, Cl. 514-352.000.

Ohno, Sadayuki: *See*—
Takagi, Kozi; Ido, Noriyuki; Ohno, Sadayuki; Suzuki, Hideaki; Inoue, Yoshiaki; and Nomura, Yoshihisa, 4,872,730, Cl. 303-92.000.

Ohno, Yuichi: *See*—
Kawasaki, Yoshiki; Hioki, Yoshihiro; Ohno, Yuichi; Ichida, Kozaburo; Yamaguchi, Susumu; Sudo, Michitaka; and Chikazawa, Bunichiro, 4,872,245, Cl. 29-81.00A.

Ohta, Shinichi, to Canon Kabushiki Kaisha. Image recording apparatus for producing a plurality of pulse width modulated signals on the basis of image data. 4,873,537, Cl. 346-108.000.

Ohtsu, Hiroshi: *See*—
Ogawa, Toshio; Fujii, Mituru; Asai, Tadamichi; Ikegami, Akira; Ohtsu, Hiroshi; and Ato, Kazuhiko, 4,873,022, Cl. 428-209.000.

Ohtsuka, Shuichi: *See*—
Yamana, Keiichi; Imai, Masaru; and Ohtsuka, Shuichi, 4,873,545, Cl. 355-256.000.

Ohuchi, Takashi: *See*—
Hirota, Toshio; Ohuchi, Takashi; and Yamamoto, Osamu, 4,873,155, Cl. 429-26.000.

Ohyagi, Takashi: *See*—
Matai, Masahiro; Ohyagi, Takashi; and Mori, Toshihiro, 4,873,519, Cl. 340-825.440.

Oikawa, Tetsuo: *See*—
Mori, Nobufumi; Katoh, Takayuki; Oikawa, Tetsuo; Harada, Yoshiyasu; and Miyahara, Junji, 4,873,440, Cl. 250-327.200.

Oike, Tomoyasu, to Minnesota Mining and Manufacturing Company. Marker for locating a buried object. 4,873,533, Cl. 343-744.000.

Oil Dynamics, Inc.: *See*—
Wilson, Brown L., 4,872,808, Cl. 415-170.100.

Okabe, Yoshimi; Iwamoto, Keiichi; Torichigai, Masaaki; Kaneko, Shozo; Ichinari, Joji; and Koizumi, Kiyoshi, to Tokyo Electric Power Co.; and Mitsubishi Jukogyo Kabushiki Kaisha. Automated ultrasonic examination system for heat transfer tubes in a boiler. 4,872,347, Cl. 73-634.000.

Okada, Takeji; Sawaide, Minoru; Imai, Minoru; and Tachibana, Daisuke, to Shimitzu Construction Co., Ltd. Resin-coated aggregates. 4,873,145, Cl. 428-407.000.

Okada, Tomonobu: *See*—
Yasukawa, Wataru, deceased; Kiyoshige, Masanori; Horikawa, Takeshi; Okada, Tomonobu; Ochi, Tadafumi; Aoki, Yoshiaki; Higashida, Masahiko; Kawashima, Takashi; Koe, Shigeki; Ono, Hideo; Nihei, Kanta; Takasugi, Syunji; and Take, Koji, 4,872,293, Cl. 51-410.000.

Okada, Yasushi: *See*—
Mieno, Toshiyuki; Nakajima, Toyohei; Okada, Yasushi; and Oono, Nobuyuki, 4,873,642, Cl. 364-431.060.

Okada, Yoshio: *See*—
Okamoto, Shosuke; Okada, Yoshio; Okunomiya, Akiko; Naito, Taketoshi; Kimura, Yoshio; Yamada, Morihiko; Ohno, Norio; Katsuura, Yasuhiro; Nojima, Hiroshi; and Shishikura, Takashi, 4,873,253, Cl. 514-352.000.

Okada, Yoshiyuki: *See*—
Aoki, Isao; Kuragano, Takashi; Okajima, Nobuyuki; and Okada, Yoshiyuki, 4,872,901, Cl. 71-90.000.

Okai, Makoto: *See*—
Uomi, Kazuhisa; Tsuji, Shinji; Sakano, Shinji; Okai, Makoto; and Chinone, Naoki, 4,873,691, Cl. 372-20.000.

Okajima, Nobuyuki: *See*—
Aoki, Isao; Kuragano, Takashi; Okajima, Nobuyuki; and Okada, Yoshiyuki, 4,872,901, Cl. 71-90.000.

Okamoto, Kenkichi: *See*—
Kono, Koichi; Okamoto, Kenkichi; Iwasaki, Rumi; and Sawada, Shuichi, 4,873,034, Cl. 264-41.000.

Okamoto, Shosuke; Okada, Yoshio; Okunomiya, Akiko; Naito, Taketoshi; Kimura, Yoshio; Yamada, Morihiko; Ohno, Norio; Katsuura, Yasuhiro; Nojima, Hiroshi; and Shishikura, Takashi, to Okamoto, Shosuke; and Showa Denko Kabushiki Kaisha. Phenylalanine derivative and proteinase inhibitor. 4,873,253, Cl. 514-352.000.

Okamoto, Tatsuo: *See*—
Watakabe, Yaichiro; Morimoto, Hiroaki; and Okamoto, Tatsuo, 4,873,163, Cl. 430-5.000.

Okamura, Michiya: *See*—
Yui, Hiroshi; Okamura, Michiya; Ikeda, Masakazu; and Matsuo, Norio, 4,873,282, Cl. 524-496.000.

Okamura, Yasushi: *See—*
Harada, Tsutomu; and Okamura, Yasushi, 4,873,596, Cl. 360-99.110.
Okano, Teruo: *See—*
Ogata, Naoya; Sanui, Kohei; Yui, Nobuhiko; Kataoka, Kazunori; Okano, Teruo; and Sakurai, Yasuhisa, 4,873,292, Cl. 525-408.000.
Okazaki, Koju: *See—*
Miura, Tohru; Nagata, Teruyuki; Okazaki, Koju; Furuya, Masayuki; and Nishida, Emiko, 4,873,374, Cl. 568-743.000.
Oki Electric Industry Co., Ltd.: *See—*
Kawakatsu, Akira, 4,873,200, Cl. 437-31.000.
Kita, Akio, 4,873,557, Cl. 357-23.100.
Yoshida, Takuji, 4,873,458, Cl. 307-362.000.
Okita, Tsutomu, to Fuji Photo Film Co., Ltd. Metallic thin film type magnetic recording medium. 4,873,138, Cl. 428-336.000.
Oklahoma Airrow, Inc.: *See—*
MacFarlane, Ronald L.; and Wilson, Dirk A., 4,872,516, Cl. 173-134.000.
Okuda, Naoki: *See—*
Sasaki, Nobukazu; Kasamura, Toshirou; Ohashi, Masashi; Okuda, Naoki; Kusumoto, Toshihiko; Maeda, Yasunori; Ozawa, Takashi; Yamamoto, Yasuyoshi; Kubota, Atsushi; Kimura, Akiyoshi; and Masuda, Makoto, 4,873,547, Cl. 355-316.000.
Okuda, Yosiro: *See—*
Takedoi, Atsushi; Kondo, Hiroyuki; Isoai, Masaru; Yoshinaga, Yoshitaka; Harada, Tosiharu; Okuda, Yosiro; Sumita, Hiroshi; Kawasaki, Hirofumi; and Mori, Kohji, 4,873,010, Cl. 252-62.590.
Okuma, Genji: *See—*
Togo, Sigeru; Saito, Yoichi; Tateyama, Masayuki; Okuma, Genji; and Miyazaki, Hiroya, 4,873,475, Cl. 318-489.000.
Okunomiya, Akiko: *See—*
Okamoto, Shosuke; Okada, Yoshio; Okunomiya, Akiko; Naito, Taketoshi; Kimura, Yoshio; Yamada, Morihiko; Ohno, Norio; Katsuura, Yasuhiro; Nojima, Hiroshi; and Shishikura, Takashi, 4,873,253, Cl. 514-352.000.
Oldfield, John: *See—*
Hughes, Leslie R.; Oldfield, John; and Tucker, Howard, 4,873,329, Cl. 544-265.000.
O'Lenick, Anthony J., Jr.; and Fanelli, Joseph J., to GAF Corporation. Cationic soil release polymers. 4,873,003, Cl. 252-8.750.
O'Lenick, Anthony J., Jr.; and Fanelli, Joseph J., to GAF Corporation. Mixture of cationic benzene carboxylate polymers from the reaction of haloacetyl terminated poly(ether-esters) with terminal quaternizing agents. 4,873,294, Cl. 525-419.000.
Olisar, Ronald A.; and Knierim, Daniel G., to Tektronix, Inc. High speed state machine. 4,873,456, Cl. 307-272.100.
Olsen, Deborah J.: *See—*
Dannels, Bobby F.; Olsen, Deborah J.; and Forcucci, John, 4,873,382, Cl. 570-177.000.
Olson, Fred C.: *See—*
Mayhew, Eric; Ehrke, M. Jane; Mace, Kenneth; Szoka, Francis; and Olson, Fred C., 4,873,088, Cl. 424-450.000.
Olson, Kurt D., to UOP. Process for the production of amides. 4,873,325, Cl. 540-536.000.
Olson, Thomas B.: *See—*
Streich, Herbert K.; Leach, Robert D.; Johnson, Joel R.; Olson, Thomas B.; and Townsend, Donald L., 4,873,422, Cl. 219-370.000.
Olympus Optical Co., Ltd.: *See—*
Kanehira, Katsuyaki; Takayama, Syuichi; Amano, Atsushi; Hibino, Hiroki; Uchiyama, Naoki; and Nakada, Akio, 4,872,458, Cl. 128-401.000.
Katoh, Akira; Ida, Masatoshi; Yunoki, Yutaka; Harada, Hisayuki; Inoue, Manabu; and Fukuda, Yoshio, 4,873,580, Cl. 358-335.000.
Matsuzaki, Minoru; Itoh, Junichi; and Watanabe, Youji, 4,873,543, Cl. 354-402.000.
Miyazaki, Akihiko; Nonami, Tetsuo; and Ikuno, Yuji, 4,873,572, Cl. 358-98.000.
OMI International Corporation: *See—*
Darken, Jeffrey, 4,873,122, Cl. 427-97.000.
Omori, Takuro; and Yanagiuchi, Shigenobu, to Sharp Kabushiki Kaisha. Command translating computer. 4,873,628, Cl. 364-200.000.
Omron Tateisi Electronics Co.: *See—*
Honda, Sueaki; Hayashi, Mitsuji; Niwa, Takashi; Hayakawa, Akihiko; and Bingo, Hideyuki, 4,873,402, Cl. 200-283.000.
Miyawaki, Yoshinori, 4,872,461, Cl. 128-681.000.
Shirai, Hironobu, 4,873,448, Cl. 250-551.000.
Omura, Hisao: *See—*
Tanaka, Yukitaka; Omura, Hisao; Irinatsu, Yuuichi; Kobayashi, Takashi; and Noguchi, Aiko, 4,873,109, Cl. 426-607.000.
Omura, Takashi; Kikkawa, Sadanobu; Morimitsu, Toshihiko; Harada, Naoki; and Miyamoto, Tetsuya, to Sumitomo Chemical Company, Limited. Monazo compounds having a triozinyl bridging group and two vinylsulfone type fiber reactive groups. 4,873,321, Cl. 534-642.000.
Oncogen: *See—*
Hellstrom, Ingegerd; Brown, Joseph P.; Hellstrom, Karl E.; Horn, Diane; and Linsley, Peter, 4,873,188, Cl. 435-7.000.
Ondeyka, John G.: *See—*
Goegelman, Robert T.; and Ondeyka, John G., 4,873,247, Cl. 514-257.000.
O'Neal, Patrick E.: *See—*
Crecelius, Ross E.; O'Neal, Patrick E.; and Crecelius, David B., 4,872,571, Cl. 215-232.000.
Ono, Hideo: *See—*
Yasukawa, Wataru, deceased; Kiyoshige, Masanori; Horikawa, Takeshi; Okada, Tomonobu; Ochi, Tadafumi; Aoki, Yoshiaki; Higashida, Masahiko; Kawashima, Takashi; Koe, Shigeki; Ono, Hideo; Nihei, Kanta; Takasugi, Syunji; and Take, Koji, 4,872,293, Cl. 51-410.000.
Ono, Hitoshi; and Kato, Yoshiaki, to Mitsubishi Kasei Corporation. Electrophotographic photoreceptor comprising a charge transport medium and a bis-azo compound containing oxygen. 4,873,164, Cl. 430-58.000.
Ono, Shuji; and Yamamoto, Masafumi, to Fuji Photo Film Co., Ltd. Laser beam scanning system. 4,873,435, Cl. 250-235.000.
Onodera, Hideo: *See—*
Kawajiri, Tatsuya; Onodera, Hideo; Uchida, Shinichi; Aoki, Yukio; and Wada, Masahiro, 4,873,217, Cl. 502-311.000.
Onodera, Kagetoshi; Koizumi, Tatsuya; Kato, Toshiyuki; Sotani, Junji; Momo, Masauki; and Furuya, Shuichi, to Fukura Electric Company, Ltd., The. Method of making heat transfer tube. 4,873,127, Cl. 427-376.800.
Oono, Nobuyuki: *See—*
Mieno, Toshiyuki; Nakajima, Toyohei; Okada, Yasushi; and Oono, Nobuyuki, 4,873,642, Cl. 364-431.060.
Ootsuka, Hiroshi: *See—*
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Petrillo, Edward W., Jr.; Karanewsky, Donald S.; Thottathil, John K.; Heikes, James E.; and Grosso, John A., to E. R. Squibb & Sons, Inc. Method for preparing phosphinic acids used in preparing ace inhibitors and intermediates produced thereby. 4,873,356, Cl. 558-180.000.
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Critton, Thomas J.; Johnson, Donald S.; Pukalo, Walter P.; and Yorio, Ralph, 4,872,369, Cl. 74-574.000.
Quaintance, James. Electrical generating apparatus and method. 4,873,450, Cl. 290-52.000.
Quernemoen, Daniel R., to Fluoroware, Inc. Reinforced carrier with embedded rigid insert. 4,872,554, Cl. 206-454.000.
Quetsch, Karl-Heinz; and Vetter, Hennig, to Vetter Maschinenfabrik GmbH. Press for expressing liquids from substances containing them, especially musts. 4,872,404, Cl. 100-125.000.

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Popovic, Vida, 4,873,141, Cl. 428-357.000.
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Rapp, Werner; Link, Walter; and Quinzio, Giovanni, 4,873,400, Cl. 178-19.000.
Quirk, Jennifer M.; and Carter, Charles G., to W. R. Grace & Co.-Conn. Preparation of nitroesters via the reaction of nitroparaffins with cyanoformates. 4,873,358, Cl. 560-22.000.
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Benner, Harold T., Jr.; and Dieterlen, Paul E., 4,872,382, Cl. 83-152.000.
R.P.R. Righella di W. Rosso & C. S.a.s.: *See—*
Rosso, Walter, 4,872,774, Cl. 401-29.000.
R.R. Donnelley & Sons Company: *See—*
Schniter, Jorg, 4,872,797, Cl. 412-25.000.
Rabe, Duane C.: *See—*
Borth, David E.; Wang, Chih-Fei; Rabe, Duane C.; and Labedz, Gerald P., 4,873,683, Cl. 370-95.100.
Rabe, William T.; and Gilbert, Wendell L., to TRW Inc. Steering gear with recirculation check valve. 4,872,393, Cl. 91-375.00A.
Radiometrics Corporation: *See—*
Nelson, Loren D.; Erb, Lee A.; Ware, Randolph H.; and Rottner, Donald, 4,873,481, Cl. 324-58.50R.
Radisson, Joel, to Sanofi. Process for the preparation of N-(2-chlorobenzyl)-2-(2-thienyl) ethylamine. 4,873,343, Cl. 549-74.000.
Radutsky, Grigory A.: *See—*
Gutov, Sergei K.; Plesser, Dmitry A.; and Radutsky, Grigory A., 4,872,800, Cl. 414-278.000.
Raether, Wolfgang: *See—*
Hammann, Peter; Grabley, Susanne; Raether, Wolfgang; Ciommer, Bernd; Kluge, Heinz; and Sachse, Burkhard, 4,873,347, Cl. 549-267.000.
Rafalow, Lee M.: *See—*
Baratz, Alan E.; Clarke, Kathryn E.; Pollard, Melinda R.; Pozefsky, Diane P.; Rafalow, Lee M.; Siddall, William E.; and Gray, James P., 4,873,517, Cl. 340-825.030.
Ragard, Phillip A., to Universal Instruments Corporation. Pick and place method and apparatus. 4,872,258, Cl. 29-740.000.
Raines, Charles D.: *See—*
Dayen, Leonid; and Raines, Charles D., 4,872,535, Cl. 188-170.000.
Rakutani, Kenji: *See—*
Tsubakimoto, Tsuneo; Ito, Hayami; Tatsumi, Shuhei; Kajibata, Yoshihiro; Takao, Shoichi; Goto, Takakiyo; Nakaishi, Akio; Rakutani, Kenji; Tamura, Toshio; and Kobayashi, Hiroya, 4,872,885, Cl. 44-51.000.
Ramachandran, Pallassana N.; Grand, Paul S.; and Bauman, Robert A., to Colgate-Palmolive Company. Fabric softening and antistatic liquid detergent compositions. 4,873,001, Cl. 252-8.800.
Ramirez, Lawrence; and Whiteside, Walter, to G. LeBlanc Corporation. Detachable mouthpipe assembly. 4,872,389, Cl. 84-387.00R.
Ramtron Corporation: *See—*
Eaton, S. Sheffield, Jr., 4,873,664, Cl. 365-145.000.
Randall, Jack E., to CPT Corporation. Method and apparatus for effectively doubling the operational speed of selected digital circuits. 4,873,704, Cl. 377-47.000.
Rao, Nancy A.: *See—*
McIntyre, John M.; Anderson, Kenneth W.; Rao, Nancy A.; and Hickner, Richard A., 4,872,961, Cl. 204-181.700.
Rao, V. N. Mallikarjuna: *See—*
Kellner, Carl S.; and Rao, V. N. Mallikarjuna, 4,873,381, Cl. 570-176.000.
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Rapp, Robert A.; and LaRoche, E. Allen, Jr., to Lanxide Technology Comapny, LP. Method for producing ceramic/metal heat storage media, and to the product thereof. 4,873,038, Cl. 264-60.000.
Rapp, Werner; Link, Walter; and Quinzio, Giovanni, to Euchner & Co. Manually activated position indicator. 4,873,400, Cl. 178-19.000.
Raspor, Otto C.: *See—*
Chau, C. C.; Im, Jang-hi; Raspor, Otto C.; and Tung, Lu H., 4,873,037, Cl. 264-49.000.
Rauh, Hans-Jurgen: *See—*
Zahn, Wolfgang; Fursich, Manfred; Nitsch, Wilhelm; Rauh, Hans-Jurgen; and Treiber, Helmut, 4,873,546, Cl. 355-38.000.
Raviv, Daniel, to Case Western Reserve University. Method and apparatus for reconstructing three-dimensional surfaces from two-dimensional images. 4,873,651, Cl. 364-513.000.
Raychem Corporation: *See—*
Kapgan, Michael, 4,872,713, Cl. 285-381.000.
Raycon Corporation: *See—*
Johnson, Trevor A.; and Gorscak, Sharon L., 4,873,415, Cl. 219-121.640.
Reafler, Gerald G.: *See—*
Fronheiser, Dennis R.; Hayward, Jack; Reafler, Gerald G.; and Schuler, James R., 4,872,270, Cl. 34-23.000.
Reale, John, Jr.: *See—*
Bartels, Craig R.; Dorawala, Tansukhlal G.; Stephenson, Michael T.; Pasternak, Mordechai; and Reale, John, Jr., 4,872,991, Cl. 210-651.000.
Rearwin, Earle W.; and Rearwin, Gayle L., to It's A Peach, Inc. Elasticized knitted band. 4,872,324, Cl. 66-172.00E.
Rearwin, Gayle L.: *See—*
Rearwin, Earle W.; and Rearwin, Gayle L., 4,872,324, Cl. 66-172.00E.
Rebers, Gunter: *See—*
Landwehr, Reinhard; and Rebers, Gunter, 4,873,049, Cl. 264-513.000.
Rechberg, Robert. Drawer slides with self-actuating latching systems. 4,872,734, Cl. 312-333.000.
Redkey, Robert H.: *See—*
Doran, Brian A.; and Redkey, Robert H., 4,872,683, Cl. 273-164.000.
Reed, William A., to U-Line Corporation. Unitary ice maker with fresh food compartment and control system therefor. 4,872,317, Cl. 62-135.000.
Rees, Theodore D.: *See—*
Chung, Chi H.; Rees, Theodore D.; and Turner, Ian, 4,873,680, Cl. 369-59.000.
Reese, Morris. Enhanced calling number delivery service system. 4,873,719, Cl. 379-215.000.
Reeves, Charles H., Jr. Water flow controller. 4,873,650, Cl. 364-510.000.
Regie Nationale des Usines Renault: *See—*
Pannier, Gerard, 4,873,606, Cl. 361-152.000.
Reimer, Kerry D.: *See—*
Wittnebel, Bruce W.; Reimer, Kerry D.; and Miller, Leonard F., 4,873,135, Cl. 428-192.000.
Reiss, Leszek: *See—*
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Remington Arms Company: *See—*
Powers, Thomas P.; Seppala, Earl E.; and Young, James C., 4,872,392, Cl. 89-193.000.
Rengstl, Alfred, to Wacker-Chemie GmbH. Process for reducing the halogen content of halogen-containing polycarbosilanes and polysilanes. 4,873,297, Cl. 525-474.000.
Renk, Russell R.: *See—*
Herbst, Robert J.; and Renk, Russell R., 4,872,959, Cl. 204-109.000.
Repta, A. J., to Merck & Co., Inc. Rectally absorbable form of L-dopa. 4,873,263, Cl. 514-535.000.
Research Development Corporation of Japan: *See—*
Ogata, Naoya; Sanui, Kohei; Yui, Nobuhiko; Kataoka, Kazunori; Okano, Teruo; and Sakurai, Yasuhisa, 4,873,292, Cl. 525-408.000.
Reyneri, Justin M.: *See—*
El Gamal, Abbas A.; El-Ayat, Khaled A.; Greene, Jonathan W.; Guo, Ta-Pen R.; and Reyneri, Justin M., 4,873,459, Cl. 307-465.000.
Rez, Donald H.: *See—*
Dunton, Harvey R.; and Rez, Donald H., 4,872,913, Cl. 106-88.000.
Rheinmetall GmbH: *See—*
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Boder, Dieter, 4,873,416, Cl. 219-121.640.
Rhone-Poulenc Chimie: *See—*
Cavezzan, Jacques; Frances, Jean-Marc; and Millet, Claude, 4,873,305, Cl. 528-18.000.
Rhone-Poulenc Nederlands B.V.: *See—*
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Rhone-Poulenc Specialites Chimiques: *See—*
Cros, Patrick; and Pipon, Robert, 4,873,323, Cl. 536-114.000.
Ricco, Mario: *See—*
Ausiello, Francesco P.; Ricco, Mario; and De Matthaeis, Sisto Luigi, 4,872,438, Cl. 123-514.000.
Rice, David A.: *See—*
Watts, Robert J.; Rice, David A.; and Neun, John A., 4,872,337, Cl. 73-162.000.
Richeson, William E.; and Erickson, Frederick L., to Magnavox Government and Industrial Electronics Company. Air powered valve actuator. 4,872,425, Cl. 123-90.130.
Richter, Bernd: *See—*
Junge, Bodo; Richter, Bernd; Glaser, Thomas; Traber, Jorg; and Allen, George S., 4,873,262, Cl. 514-510.000.
Rickmann, Hans-Werner: *See—*
Giersch, Dieter; Rickmann, Hans-Werner; and Wibbeling, Ulrich, 4,872,274, Cl. 37-64.000.
Ricoh Company, Ltd.: *See—*
Kameyama, Toshiaki; and Kobayashi, Yuichi, 4,872,660, Cl. 271-9.000.
Kato, Toshio; Uotani, Kunihiro; and Ito, Mitsuhiko, 4,872,659, Cl. 271-9.000.
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Watanabe, Toshio, 4,873,550, Cl. 355-232.000.
Riddell, Inc.: *See—*
Wingo, James C., Jr., 4,872,216, Cl. 2-2.000.
Rieder, Werner, to Minnesota Mining and Manufacturing Company. Process for the preparation of aromatic polyesters and apparatus for carrying out this process. 4,873,060, Cl. 422-135.000.
Riesen, Peter, to Sulzer Brother Limited. Projectile-catching brake for a loom. 4,872,487, Cl. 139-185.000.
Ring, Klaus: *See—*
Heckmann, Klaus; Manecke, Georg; Pfannenmuller, Beate; Ring, Klaus; and Ringsdorf, Helmut, 4,873,033, Cl. 264-41.000.
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Heckmann, Klaus; Manecke, Georg; Pfannenmuller, Beate; Ring, Klaus; and Ringsdorf, Helmut, 4,873,033, Cl. 264-41.000.
Rinko, Kenneth S. Roll-off solder tip. 4,872,605, Cl. 228-51.000.
Rippel, Wally E.; and Edwards, Dean B. Positive paste with lead-coated glass fibers. 4,873,161, Cl. 429-225.000.
Rippel, Wally E., to California Institute of Technology. Monolithic transistor gate energy recovery system. 4,873,460, Cl. 307-571.000.

Risk, William P.; and Kino, Gordon S., to Leland Stanford Junior University, The Board of Trustees of the. Acousto-optic fiber-optic frequency shifter using periodic contact with a surface acoustic wave. 4,872,738, Cl. 350-96.290.

Rivero-Olmedo, Jose M. Expansion mechanism for meter box or meter yoke. 4,872,338, Cl. 73-201.000.

Roach, Theodore H.: *See—*
Hoye, Robert S.; and Roach, Theodore H., 4,872,672, Cl. 273-1.00E.

Roane, Bobby A., to Texas Instruments Incorporated. Method and apparatus for providing interconnection between metallization layers on semiconductor devices. 4,873,565, Cl. 357-71.000.

Robert Bosch GmbH: *See—*
Burk, Peter; and Hahn, Klaus, 4,873,640, Cl. 364-426.040.
Hecht, Hans; and Kuhnt, Winfried, 4,873,490, Cl. 328-3.000.
Steigmaier, Alwin, 4,872,732, Cl. 303-110.000.

Roberts, Rowena L.: *See—*
Chmurny, Alan B.; Gross, Akiva T.; Kupper, Robert J.; and Roberts, Rowena L., 4,873,359, Cl. 560-40.000.

Roberts, Teddy P.; and Rozanski, Walter J., Jr., to Motorola, Inc. Method and apparatus for remote talk/listen communication system. 4,873,711, Cl. 379-58.000.

Robertshaw Controls Company: *See—*
Katchka, Jay R.; Yeaman, George A.; and McKinney, Richard W., 4,872,830, Cl. 431-54.000.

Robertson, David J.: *See—*
Irwin, George F.; Smelters, Paul J.; Robertson, David J.; and Maginley, Ronald J., 4,873,682, Cl. 370-58.100.

Robertson, Douglas D., to Brigham & Women's Hospital. X-ray tomography phantoms, method and system. 4,873,707, Cl. 378-18.000.

Robertson, Peter M.; and Suter, Erwin, to Zellweger Uster Ltd. Apparatus for carrying out a titration procedure for the chemical analysis of a sample. 4,873,057, Cl. 422-75.000.

Robin, Jean-Pierre; and Landais, Yannick, to Universite Du Maine (Le Mans). Ruthenium catalyst for biarylic coupling; new steganolides. 4,873,349, Cl. 549-298.000.

Robinson, Alan S.; and Fuller, Mark W., to Wet Enterprises, Inc. Venturi-less water nozzle. 4,872,611, Cl. 239-18.000.

Robinson, Raymond S.: *See—*
Kaufman, Harold R.; and Robinson, Raymond S., 4,873,467, Cl. 313-360.100.

Rock, Erich; and Brunner, Josef, to Julius Blum Gesellschaft M.B.H. Drawer including roller carrier connecting side walls to rear member. 4,872,735, Cl. 312-342.000.

Rock, John A.: *See—*
Holub, Fred F.; Abolins, Visvaldis; and Rock, John A., 4,873,287, Cl. 525-92.000.

Rockwell-CIM: *See—*
Periou, Pierre, 4,872,903, Cl. 74-89.150.

Rockwell International Corporation: *See—*
Millis, Hugh L., Jr., 4,873,685, Cl. 371-36.000.
Trachman, Edward G.; Shih, Shan; and Arzoian, John, 4,872,374, Cl. 74-731.000.
Trachman, Edward G.; Shih, Shan; and Arzoian, John, 4,872,375, Cl. 74-731.000.

Roe, James: *See—*
Spiel, Albert A.; Roe, James; and Spanier, Henry C., 4,873,096, Cl. 426-72.000.

Roemer, Erich; Kuhn, Matthaus; and Maurer, Leonhard, to Glyco-Metall-Werke, Daelen & Loos GmbH. Method of making a plain bearing shell. 4,872,248, Cl. 29-149.5DP.

Rogers Corporation: *See—*
Hernandez, Jorge M., 4,873,612, Cl. 361-321.000.

Rogers, Derek J.: *See—*
Dong, Dennis F.; Noonan, Edward B.; Rogers, Derek J.; Clifford, Arthur L.; Benesch, Katharina; and Loftfield, Richard E., 4,872,957, Cl. 204-84.000.

Rohm, Gunter H. Lathe chuck. 4,872,691, Cl. 279-123.000.

Rohm and Haas Company: *See—*
Pirotta, Marico G., 4,872,989, Cl. 210-638.000.

Rohner, Gerhard; Idigkeit, Werner; and Kurr, Klaus, to Carl Freudenberg, Firma. Two chamber engine mount. 4,872,652, Cl. 267-140.100.

Rohrberg, Roderick G.; Rohrberg, Timothy K.; and McGushion, Kevin D. Microcube interconnection hardware. 4,872,355, Cl. 73-866.500.

Rohrberg, Timothy K.: *See—*
Rohrberg, Roderick G.; Rohrberg, Timothy K.; and McGushion, Kevin D., 4,872,355, Cl. 73-866.500.

Rohrer, Charles E.: *See—*
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Rolls Royce Inc.: *See—*
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Roltra S.p.A.: *See—*
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Ronco, Robert L., Sr.; and Wolk, Piero, to Schlumberger Technology Corporation. Well bore apparatus arranged for operating in high-temperature wells as well as in low-temperature wells. 4,872,507, Cl. 166-57.000.

Ronlund Sports Products, Inc.: *See—*
Brandell, John R., 4,872,671, Cl. 272-137.000.

Rosen, Hal J.: *See—*
Juliana, Anthony; Leung, Wai C.; Pan, Victor T.; Rosen, Hal J.; and Strand, Timothy C., 4,873,430, Cl. 250-225.000.

Rosenberg, Melvyn; and Eli, Ilana. Method of separating or purifying proteins and other biopolymers. 4,873,317, Cl. 530-412.000.

Rosenblum, Myron, to Brandeis University. Organometallic polymer. 4,873,304, Cl. 528-9.000.

Rosenthal, Doy. Electric positioning apparatus. 4,872,363, Cl. 74-479.000.

Ross, Bruce E.; and Ross, Gail C. Motion sensitive animated figure display. 4,872,278, Cl. 40-424.000.

Ross, Gail C.: *See—*
Ross, Bruce E.; and Ross, Gail C., 4,872,278, Cl. 40-424.000.

Ross, Milton I. Method and apparatus for making encapsulated electronic circuit devices. 4,872,825, Cl. 425-117.000.

Ross, Rudi: *See—*
Krause, Hans; Ross, Rudi; and Koch, Helmut, 4,872,769, Cl. 384-226.000.

Ross, Stephen T.: *See—*
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Rosso, Walter, to R.P.R. Righella di W. Rosso & C. S.a.s. Instrument for writing and drawing. 4,872,774, Cl. 401-29.000.

Rossy, Philip A.; Thyes, Marco; Franke, Albrecht; Koenig, Horst; Lehmann, Hans D.; Gries, Josef; Friedrich, Ludwig; and Lenke, Dieter, to BASF Aktiengesellschaft. 6-(acylaminoaryl)-3(2H)-pyridazinone derivatives, and their use. 4,873,246, Cl. 514-252.000.

Rottner, Donald: *See—*
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Rozanski, Walter J., Jr.: *See—*
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Ruark, Darryl L., to A. O. Smith Corporation. Water heater with power vent access door. 4,872,443, Cl. 126-361.000.

Rubbo, Richard P.: *See—*
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Ruder, Donna L.; Feldman, Lyudmila; and Dowler, James A., to Mead Corporation, The. Imaging system utilizing heat treatment. 4,873,168, Cl. 430-138.000.

Ruesch, James R., to Micro Motion Incorporated. Net oil computer. 4,872,351, Cl. 73-861.040.

Rufin, Denis; and Hirase, Ikuo, to L'Air Liquide, Societe Anonyme Pour l'Etude et l'Explanation des Procedes Georges Claude. Process for the control in real time of the selectivity of the etching by analysis of the plasma gases in a process of reactive ionic etching and a reactor therefore. 4,872,944, Cl. 156-626.000.

Rugora, Edoardo: *See—*
Pristera, Raffaele; Rugora, Edoardo; Fioravazzi, Silvio; Guelfi, Giorgio; Bassi, Aldo; and Poli, Alberto, 4,873,451, Cl. 307-10.100.

Ruiz, Mark R. Edible food product and package. 4,873,099, Cl. 426-104.000.

Rundle, Kevin W. Extraction of soluble materials from whole citrus fruit. 4,873,095, Cl. 426-50.000.

Rupprecht, Eckhard: *See—*
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Russo, Paul J.: *See—*
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Rusterholz, John T.; Lahti, Archie E.; Bushard, Louis B.; Byers, Larry L.; Hamstra, James R.; and Homan, Charles J., to Unisys Corporation. Scientific processor to support a host processor referencing common memory. 4,873,630, Cl. 364-200.000.

Rutigliano, Frank. Drip-can holder. 4,872,631, Cl. 248-313.000.

Ryder, Francis E.; Kanner, Rowland W.; and Williams, Fred E., to Ryder International Corporation. Wall plug lends disinfector. 4,873,424, Cl. 219-521.000.

Ryder International Corporation: *See—*
Ryder, Francis E.; Kanner, Rowland W.; and Williams, Fred E., 4,873,424, Cl. 219-521.000.

Rye, Ralph K. Adjustable armed chair. 4,872,727, Cl. 297-411.000.

Ryntz, Rose A., to Du Pont de Nemours, E. I., and Company. Polyester graft copolymers, flexible coating compositions comprising same and branched polyester macromers for preparing same (III). 4,873,285, Cl. 525-28.000.

Ryntz, Rose A., to Du Pont de Nemours, E. I., and Company. Polysiloxane graft copolymers, flexible coating compositions comprising same and branched polysiloxane macromers for preparing same II. 4,873,298, Cl. 525-479.000.

S. Eisenberg & Co., Division of Creative Industries, Inc.: *See—*
Lake, Connie, 4,872,608, Cl. 229-2.5EC.

Sachse, Burkhard: *See—*
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Sachtler, J. W. Adriaan; and Lawson, R. Joe, to UOP. Process for the isomerization of aromatics. 4,873,387, Cl. 585-482.000.

Saen, Haruo; and Kobayashi, Kougi, to Sumitomo Electric Industries, Ltd. Method of spot-welding flat-type electrical wires to metal terminals. 4,873,411, Cl. 219-93.000.

Safe-Test, Inc.: *See—*
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Sagami Chemical Research Center: *See—*
Umemoto, Teruo; and Gotoh, Yoshihiko, 4,873,027, Cl. 562-83.000.

Sagawa, Yuzo: *See*—
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Saiki, Kozo: *See*—
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Saito, Akihiro: *See*—
Fuji, Susumi; Ishida, Hiromi; Morioka, Masataka; Saito, Akihiro; and van der Meer, Roelof, 4,873,276, Cl. 524-153.000.

Saito, Hajime: *See*—
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Saito, Haruo; Kranz, David M.; Eisen, Herman N.; and Tonegawa, Susumu, to Massachusetts Institute of Technology. Heterodimeric T lymphocyte receptor. 4,873,190, Cl. 435-172.300.

Saito, Hiroyuki, to Nippon Seiko Kabushiki Kaisha. Passive seat belt system. 4,872,703, Cl. 280-804.000.

Saito, Yoichi: *See*—
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Saito, Yoshihiko: *See*—
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Saito, Yoshio: *See*—
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Saitoh, Masayuki: *See*—
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Sakai, Akira: *See*—
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Sakai Chemical Industry Co., Ltd.: *See*—
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Sakai, Hiroshi: *See*—
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Sakai, Takashi, to Akebono Brake Industry Co., Ltd.; and Akebono Research and Development Centre Ltd. Safety device for a radiator cap. 4,872,584, Cl. 220-201.000.

Sakamoto, Keiji: *See*—
Kurakake, Mitsuo; Sakamoto, Keiji; and Iwamoto, Takashi, 4,873,476, Cl. 318-568.220.

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Fujisawa, Norio; Sakamoto, Toshishige; Ito, Toshiyasu; and Shimada, Junichi, 4,872,745, Cl. 350-357.000.

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Uomi, Kazuhisa; Tsuji, Shinji; Sakano, Shinji; Okai, Makoto; and Chinone, Naoki, 4,873,691, Cl. 372-20.000.

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Terada, Hiromu; Fukahori, Noyuki; and Sakunaga, Kenichi, 4,872,740, Cl. 350-96.260.

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Salan, Antonio: *See*—
Ciaperoni, Aldemaro; Cappelli, Alberto; D'Andolfo, Francesco; and Salan, Antonio, 4,873,296, Cl. 525-434.000.

Sallay, Stephen I. Insecticidal composition. 4,873,084, Cl. 424-658.000.

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Szafranski, Pierre, 4,872,698, Cl. 280-605.000.

Salz, Gilbert; and Sullivan, Mark. Prophylactic apron. 4,872,462, Cl. 128-842.000.

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Kwon, Hisung, 4,873,454, Cl. 307-140.000.

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Han, Bong H., 4,872,527, Cl. 181-160.000.

Sanbuichi, Hiroshi: *See*—
Nagaishi, Hatsuo; Seimiya, Yasuo; Tamura, Hideyuki; Miwa, Hiromichi; Sanbuichi, Hiroshi; Uchida, Masaaki; and Takahata, Toshio, 4,873,641, Cl. 364-431.040.

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Osamu, Anazawa, 4,872,592, Cl. 221-6.000.
Takai, Kazuhiko, 4,872,815, Cl. 417-222.000.

Sanders, Robert J.: *See*—
Fuller, Robert T.; and Sanders, Robert J., 4,872,580, Cl. 211-45.000.

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Laurent, Sebastian M.; and Sanders, Robert N., 4,873,097, Cl. 426-74.000.
Laurent, Sebatian M.; and Sanders, Robert N., 4,872,421, Cl. 119-1.000.

Sanders, Ward L.: *See*—
Brendgord, Thomas; Sanders, Ward L.; and Coon, Dennis C., 4,872,656, Cl. 269-322.000.

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Sandvik AB: *See*—
Lundell, Lars-Gunnar, 4,872,515, Cl. 173-132.000.

Sanemitsu, Yuzuru: *See*—
Katoh, Tsuguhiro; Maeda, Kiyoto; Shiroshita, Masao; Yamashita, Norihisa; Sanemitsu, Yuzuru; and Inoue, Satoru, 4,873,248, Cl. 514-269.000.

Sanielevici, Sergio A., to Tektronix, Inc. Integrated sample and hold circuit. 4,873,457, Cl. 307-353.000.

Sankyo Company Limited: *See*—
Yoshioka, Takao; Kanai, Tsutomu; Aizawa, Yuichi; Horikoshi, Hiroyoshi; and Hasegawa, Kazuo, 4,873,255, Cl. 514-369.000.

Sanofi: *See*—
Radisson, Joel, 4,873,343, Cl. 549-74.000.
Wermuth, Camille G.; Schlewer, Gilbert; and Heaulme, Michel, 4,873,243, Cl. 514-248.000.

Sanshin Kogyo Kabushiki Kaisha: *See*—
Hasegawa, Junichi; and Takahashi, Hideharu, 4,872,858, Cl. 440-38.000.

Sant, Peter: *See*—
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Sanui, Kohei: *See*—
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Ishizaka, Yoshirou; Naganuma, Hiroshi; Sato, Kenji; Kishi, Yuji; Ishida, Yoshihisa; and Goto, Kiyokazu, 4,872,320, Cl. 62-255.000.
Miyazaki, Noriyuki; and Matsuoka, Tetsunori, 4,873,160, Cl. 429-170.000.

Saotome, Yasushi; Miyazawa, Takeo; and Endo, Takeshi, to M & D Research Co., Ltd. Optically active, ethylenically unsaturated polymers of amino penicillanic acid compounds. 4,873,301, Cl. 526-257.000.

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Sarasota Automation Limited: *See*—
Jefferis, Brian C., 4,873,494, Cl. 331-65.000.

Sargent, Desmond J., to Post Office, The. Information handling system and terminal apparatus therefor. 4,873,662, Cl. 364-900.000.

Sarna, David E. Y.; and Mailick, Daniel, to Image Business Systems Corporation. Technique for reading bar codes. 4,873,426, Cl. 235-462.000.

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Kadowaki, Koju; Sarumaru, Kohei; and Shibano, Takeshi, 4,873,368, Cl. 562-532.000.

Sasakawa, Atsushi: *See*—
Matsuda, Toshiharu; Sasakawa, Atsushi; Hayashi, Shoichiro; and Konai, Yutaka, 4,873,366, Cl. 562-416.000.

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Sasaki, Hidemi: *See*—
Negishi, Kenji; Sasaki, Hidemi; and Fujishiro, Takeshi, 4,873,598, Cl. 360-106.000.

Sasaki, Hitoshi; and Igota, Shoji, to Ajinomoto Co., Inc. Resin coated can with folded seam. 4,872,590, Cl. 220-457.000.

Sasaki, Isao: *See*—
Hirayama, Shigemitsu; Akashi, Takamichi; Ikuta, Akio; Sasaki, Isao; and Fukuda, Hiroshi, 4,872,974, Cl. 210-90.000.

Sasaki, Kinihiko: *See*—
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Sasaki, Nobukazu; Kasamura, Toshirou; Ohashi, Masashi; Okuda, Naoki; Kusumoto, Toshihiko; Maeda, Yasunori; Ozawa, Takashi; Yamamoto, Yasuyoshi; Kubota, Atsushi; Kimura, Akiyoshi; and Masuda, Makoto, to Canon Kabushiki Kaisha. Sheet conveying apparatus. 4,873,547, Cl. 355-316.000.

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Sasse, Klaus: *See*—
Kruger, Bernd-Wieland; Sasse, Klaus; Hoever, Franz-Peter; Nentwig, Gunther; and Berhrenz, Wolfgang, 4,873,252, Cl. 514-315.000.

Satake, Tokuki; Sakai, Hiroshi; Nakatani, Hayami; Nakamori, Masaharu; and Ishibashi, Masaru, to Mitsubishi Jukogyo Kabushiki Kaisha. Solid electrolytic fuel cell and method for manufacturing same. 4,873,156, Cl. 429-31.000.

Satake, Yoshikatsu; Iizuka, Yo; Kouyama, Toshitaka; Katto, Takayuki; and Shiiki, Zenya, to Kureha Kagaku Kogyo K.K. Molded or formed poly(arylene thioether-ketone) articles. 4,873,283, Cl. 524-520.000.

Satalich, Timothy A.: *See*—
Davidson, Wayne A.; Ernst, John P.; Herkes, Marybeth; Kuppuswami, Ram; Satalich, Timothy A.; and Stanaway, John J., Jr., 4,873,717, Cl. 379-157.000.

Sato, Chikara: *See*—
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Sato, Hatsuo: *See*—
Adachi, Ikuo; Yamamori, Teruo; Ueda, Motohiko; and Sato, Hatsuo, 4,873,334, Cl. 514-303.000.

Sato, Hideki; and Mizunoya, Nobuyuki, to Kabushiki Kaisha Toshiba. Aluminum nitride circuit substrate. 4,873,151, Cl. 428-627.000.

Sato, Hiroshi; Ohashi, Toshijiro; Hamada, Toyohide; Umakoshi, Yukimori; Suzuki, Takamichi; Wada, Yuuji; Hara, Shigeo; and Fukumoto, Youshuke, to Hitachi, Ltd. Apparatus for winding coil on toroidal core. 4,872,618, Cl. 242-4.00R.

Sato, Katsuyuki: *See*—
Shimizu, Shinji; Tsuchiya, Osamu; and Sato, Katsuyuki, 4,873,559, Cl. 357-23.600.

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Inoue, Kazutaka; Sato, Toshihiro; and Kobayashi, Masao, 4,873,391, Cl. 585-639.000.

Sato, Yoshiyuki: *See*—
Tanaka, Hatsuyuki; Sato, Yoshiyuki; Kohara, Hidekatsu; and Nakayama, Toshimasa, 4,873,177, Cl. 430-326.000.

Sato, Youichi: *See*—
Nakamura, Hironori; Yotsui, Toshiaki; Sato, Youichi; Umetsubo, Toshiaki; and Ohkawa, Hideo, 4,872,247, Cl. 29-125.000.

Satoh, Masaharu: *See*—
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Satoh, Motohiro; Yamada, Toshihiro; Kohono, Akiomi; Yamamoto, Akihiko; Taguchi, Keiji; Daikoku, Takahiro; and Kobayashi, Fumiuki, to Hitachi, Ltd. Sealed structure and production method thereof. 4,872,606, Cl. 228-121.000.

Satoh, Yayoi; and Mizukami, Toshihiko, to NEC Corporation. Multipulse encoder including an inverse filter. 4,873,724, Cl. 381-40.000.

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Ueno, Hiroshi; Satomi, Tomoaki; and Yoshida, Teruo, 4,872,771, Cl. 384-492.000.

Sattmann, Karl. Automatic cylinder profiling gage. 4,872,269, Cl. 33-552.000.

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Kono, Koichi; Okamoto, Kenkichi; Iwasaki, Rumi; and Sawada, Shuichi, 4,873,034, Cl. 264-41.000.

Sawaide, Minoru: *See*—
Okada, Takeji; Sawaide, Minoru; Imai, Minoru; and Tachibana, Daisuke, 4,873,145, Cl. 428-407.000.

Sawamura, Norio; Matsuo, Takaharu; Tsumura, Kazunobu; and Ebihara, Yoshitaka, to Fuji Oil Company, Limited. Process for preparing enzyme preparation. 4,873,194, Cl. 435-198.000.

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Bucher, Michael S.; Russo, Paul J.; and Schaar, Robert J., 4,872,919, Cl. 134-3.000.

Schaefer, Gerhard; Eilingsfeld, Heinz; Neumann, Peter; and Stumpp, Michael, to BASF Aktiengesellschaft. Isolation of 4,4'-dichlorodiphenyl sulfone. 4,873,372, Cl. 568-34.000.

Schaffer, A. M.: *See*—
Walker, Darrell W.; and Schaffer, A. M., 4,873,211, Cl. 502-64.000.

Scharf, Curtis R.: *See*—
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Schatzmann, Hans-Rudolf: *See*—
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Scheer, Wolfgang; Fuhrmann, Hartmut; Kossmehl, Gerhard; Niemitz, Matthias; and Kabbeck-Kupijai, Detlef, to MAN Technologie GmbH. Printing press. 4,872,962, Cl. 204-224.00R.

Schepky, Gottfried: *See*—
Brickl, Rolf; Schepky, Gottfried; Rupprecht, Eckhard; and Greischel, Andreas, 4,873,080, Cl. 424-80.000.

Schering Corporation: *See*—
Schumacher, Doris P.; Murphy, Bruce L.; and Clark, Jon E., 4,873,335, Cl. 546-194.000.

Scheuble, Bernard: *See*—
Krause, Joachim; Wachtler, Andreas; Scheuble, Bernard; and Weber, Georg, 4,873,019, Cl. 252-299.610.

Schild, Ronald H.; Koeplin-Gall, Sandra; and Broxterman, Gregory C., to Nalco Chemical Company. Mixture of halides such as NaOCl and a bromide salt for removal of mussels and barnacles from salt or brackish water. 4,872,999, Cl. 210-754.000.

Schilling, Walter W.: *See*—
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Schisler, Robert C.: *See*—
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Schissel, David N.: *See*—
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Schleich, Gunter, to Index-Werke Comm.-Ges. Hahn & Tessky. Turret with several drivable tool spindles for a machine tool. 4,872,244, Cl. 29-40.000.

Schlesinger, Marcia S.: *See*—
Leonard, Thomas W.; Mikula, Karol Kay; and Schlesinger, Marcia S., 4,873,266, Cl. 514-653.000.

Schlewer, Gilbert: *See*—
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Schlumberger Industries: *See*—
Barraud, Claude, 4,873,721, Cl. 380-9.000.
Langlais, Joel; and Paumard, Maurice, 4,873,425, Cl. 235-441.000.

Schlumberger Technology Corporation: *See*—
Barber, Thomas D.; Chandler, Richard N.; and Hunka, John F., 4,873,488, Cl. 324-339.000.
Ronco, Robert L., Sr.; and Wolk, Piero, 4,872,507, Cl. 166-57.000.
Wignall, Albert H.; and Hoyle, David C., 4,872,526, Cl. 181-102.000.

Schmalzi, Karl J.; Sharma, Suresh C.; and Christopherson, Richard I., to University of Melbourne, The; and University of Sydney, The. 2-oxo-4-carboxy-pyrimidines and their use as anti-malaria and anti-cancer agents. 4,873,228, Cl. 514-49.000.

Schmerda, Richard F.; and Hansen, James E., to Eaton Corporation. DC motor speed controller having protection. 4,873,453, Cl. 307-130.000.

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Schmidt, Parbury P.: *See*—
Talroy, Robert C.; Ward, Sarah G.; and Schmidt, Parbury P., 4,873,226, Cl. 514-46.000.

Schmidt, Theodore E.: *See*—
Peirish, Alfred J.; Schmidt, Theodore E.; and Thomas, William C., 4,872,286, Cl. 49-449.000.

Schmidt, Walter: *See*—
Neulinger, Franz; Schummer, Helmut; Donig, Gerhard; and Schmidt, Walter, 4,873,620, Cl. 363-57.000.

Schmitt, Susan M.: *See*—
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Schneider, Peter J. Separable and breakaway valve interconnecting a fluid line. 4,872,471, Cl. 137-68.100.

Schneider, Richard T., to Progress Technology Corporation. Magnetic superconducting detector. 4,873,443, Cl. 250-336.200.

Schneider, Rolf: *See*—
Behr, Hans; Vetter, Kurt; Schneider, Rolf; and Luderer, Fred, 4,872,616, Cl. 239-703.000.

Schniter, Jorg, to R.R. Donnelley & Sons Company. Book opening apparatus. 4,872,797, Cl. 412-25.000.

Schodowski, Stanley S., to United States of America, Army. Dual mode quartz thermometric sensing device. 4,872,765, Cl. 374-117.000.

Schoon, Hinrich, to Preci-Plast AB. Dispenser for medical preparations. 4,872,559, Cl. 206-538.000.

Schrage, Jay T.: *See*—
Schrage, Timothy L.; Schrage, Jay T.; and Schrage, Lester, 4,872,785, Cl. 406-155.000.

Schrage, Lester: *See*—
Schrage, Timothy L.; Schrage, Jay T.; and Schrage, Lester, 4,872,785, Cl. 406-155.000.

Schrage, Timothy L.; Schrage, Jay T.; and Schrage, Lester. Shut-off means for air-actuated planter. 4,872,785, Cl. 406-155.000.

Schreier, Klaus: *See*—
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Schultz, Jim, to Guardian Products, Inc. Crutch with stair deflector. 4,872,469, Cl. 135-69.000.

Schulz, Gerd; and Hertleif, Hans-Peter. Pivotation device for a centrifugal chain assembly in a motor vehicle. 4,872,359, Cl. 74-109.000.

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Schumacher, Doris P.; Murphy, Bruce L.; and Clark, Jon E., to Schering Corporation. 3-phenethyl-2-benzene-amides or aza-derivatives thereof. 4,873,335, Cl. 546-194.000.

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Schwartz, John E. Valve apparatus. 4,872,640, Cl. 251-147.000.

Schweighardt, Frank K.; Bailey, Webb I.; Lileck, John T.; Graybill, John K.; and Lutz, Eugene G., to Air Products and Chemicals, Inc. Perfluorinated propyl derivative compounds. 4,873,315, Cl. 570-130.000.

Schweitzer, Edmund O., Jr. Electromechanical pulse counter. 4,873,706, Cl. 377-85.000.

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Scolten, Brian L.: *See—*
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Scordo, Dominick: *See—*
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Scott, Jeffery W.: *See—*
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Scotto, Anthony W.; and Zakim, David, to Cornell Research Foundation Inc., Cornell University. Proteoliposomes as drug carriers. 4,873,089, Cl. 424-450.000.

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Seaburn, William H.: *See—*
Englehart, John D.; and Seaburn, William H., 4,872,589, Cl. 220-410.000.

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Sechrist, Paul A., to UOP. Method for valveless control of particle transport. 4,872,969, Cl. 208-173.000.

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Seele, Harold A. Work-holding implement and bench-mounted loading fixture therefor. 4,872,654, Cl. 269-3.000.

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Seeley, Douglas A.: *See—*
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Seiko Instruments Inc.: *See—*
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Seimiya, Yasuo: *See—*
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Sekine, Noboru; Aoki, Takashi; and Terayama, Satoshi, to Honda Giken Kogyo Kabushiki Kaisha. Clutch control method for fluid torque converter of vehicular transmission. 4,872,540, Cl. 192-0.076.

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Fujita, Takashi; Hihara, Toshio; Kogure, Yoshio; Sekioka, Riyouichi; and Nakamura, Noboru, 4,872,881, Cl. 8-549.000.

Sekiyama, Shigeo, to Isuzu Motors Limited. Engine brake device. 4,872,434, Cl. 123-320.000.

Selenia Industrie Elettroniche Associate S.p.A.: *See—*
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Thompson, Raymon F.; and Funk, Larry, 4,872,638, Cl. 251-54.000.

Senga, Takao; Takaoka, Kazuchiyo; Yamamoto, Hirokazu; and Hashimoto, Takimi, to Mitsubishi Paper Mills, Ltd. Liquid developer for electrophotography. 4,873,166, Cl. 430-137.000.

Seo, Hiroshi: *See—*
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Seppala, Earl E.: *See—*
Powers, Thomas P.; Seppala, Earl E.; and Young, James C., 4,872,392, Cl. 89-193.000.

Sera, Kyoji: *See—*
Nakagawa, Kazushige; Koh, Makoto; Sera, Kyoji; Ozeki, Tadashi; and Iwasaki, Masahiro, 4,872,394, Cl. 91-506.000.

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Kobayashi, Hiroo; Fujino, Hitoshi; Yagi, Tadashi; Adachi, Nobukazu; Hayakawa, Yasuyoshi; and Setoriyama, Takeshi, 4,873,548, Cl. 355-200.000.

SGS-Thomson Microelectronics S.A.: *See—*
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Shankar, Pradip: *See—*
Crandall, Douglas; Cavanna, Vicente; Shankar, Pradip; and Nordby, Rasmus, 4,873,703, Cl. 375-118.000.

Shanrock, Clay: *See—*
Howard, Albert, 4,872,823, Cl. 425-64.000.

Shapiro, Warren B.: *See—*
Hahn, Charles R.; and Shapiro, Warren B., 4,873,079, Cl. 424-70.000.

Sharma, Suresh C.: *See—*
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Sharp Kabushiki Kaisha: *See—*
Inaba, Masakatsu, 4,873,553, Cl. 355-295.000.
Omori, Takuro; and Yanagiuchi, Shigenobu, 4,873,628, Cl. 364-200.000.

Sharps, Gordon V., Jr.; and St. Phillips, Eric A., to Mobil Oil Corporation. Seal bar including clamped seal element. 4,872,942, Cl. 156-515.000.

Shaw, Daniel G.; and MacCline, Billy. Rotatable fluid conductor for well apparatus. 4,872,517, Cl. 173-163.000.

Shaw, Henry: *See—*
Gryson, Dirk; and Shaw, Henry, 4,872,488, Cl. 139-353.000.

Shaw, Richard E.; and Wolverton, Steven R., to Cooper Industries, Inc. Poppet valve flow seat. 4,872,481, Cl. 137-543.170.

Shawl, Edward T.; and Kesling, Haven S., Jr., to Arco Chemical Technology, Inc. Process for the preparation of methylene diphenylene diisocyanates and polymethylene polyphenylene poly (diisocyanates). 4,873,364, Cl. 560-344.000.

Shell Oil Company: *See—*
Beverwijk, Christiaan D. M.; De Jong, Feike; and Sant, Peter, 4,873,004, Cl. 252-32.500.
Bolsman, Theodorus A. B. M., 4,873,025, Cl. 562-91.000.
Corley, Larry S., 4,873,309, Cl. 528-102.000.
Dicks, Lynton W. R., 4,872,345, Cl. 73-597.000.
Epel, Joseph N., 4,873,044, Cl. 264-257.000.
Sie, Swan T.; Drent, Eit; and Jager, Willem W., 4,873,267, Cl. 518-700.000.
Stapersma, Johan, 4,873,212, Cl. 502-158.000.
Stapersma, Johan, 4,873,333, Cl. 546-14.000.

Shen, Hsin-Der. Air vent throat of indoor ventilating device capable of preventing noise. 4,872,398, Cl. 98-42.080.

Shepard, Daniel R. Disposable cat litter system. 4,872,420, Cl. 119-1.000.

Sheppard, Harold A. Fender fast clip remover. 4,872,251, Cl. 29-243.560.

Sherman, Fred: *See—*
Fishman, Jack; Arnold, John; Sherman, Fred; and Hsiao, Jane, 4,873,076, Cl. 424-10.000.

Shibagaki, Kouichi; and Fukui, Akira, to NEC Corporation. Method and apparatus for multi-pulse speech coding. 4,873,723, Cl. 381-34.000.

Shibano, Takeshi: *See—*
Kadowaki, Koju; Sarumaru, Kohei; and Shibano, Takeshi, 4,873,368, Cl. 562-532.000.

Shibata, Yoji, to Hitachi, Ltd. Automatic data/voice sending/receiving mode switching device. 4,873,715, Cl. 379-93.000.

Shih, Shan: *See—*
Trachman, Edward G.; Shih, Shan; and Arzoian, John, 4,872,374, Cl. 74-731.000.
Trachman, Edward G.; Shih, Shan; and Arzoian, John, 4,872,375, Cl. 74-731.000.

Shih, Wen-cheng: *See—*
Ma, Chen-chi M.; and Shih, Wen-cheng, 4,873,128, Cl. 427-434.700.

Shiiki, Zenya: *See—*
Satake, Yoshikatsu; Iizuka, Yo; Kouyama, Toshitaka; Katto, Takayuki; and Shiiki, Zenya, 4,873,283, Cl. 524-520.000.

Shimada, Junichi: *See—*
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Shimadzu Corporation: *See—*
Nakagawa, Kazushige; Koh, Makoto; Sera, Kyoji; Ozeki, Tadashi; and Iwasaki, Masahiro, 4,872,394, Cl. 91-506.000.

Shimanaka, Chikafumi: *See—*
Wakamori, Takehisa; Ogawa, Takashi; Ito, Ryoji; and Shimanaka, Chikafumi, 4,872,257, Cl. 29-701.000.

Shimasaki, Katsunori: *See—*
Kaji, Kichiro; Shimasaki, Katsunori; Yamamoto, Masakazu; Saiki, Kozo; Yura, Keita; Habata, Hidetsugu; Kimura, Isao; and Suzuki, Tetsuo, 4,873,070, Cl. 423-345.000.

Shimitzu Construction Co., Ltd.: *See—*
Okada, Takeji; Sawaide, Minoru; Imai, Minoru; and Tachibana, Daisuke, 4,873,145, Cl. 428-407.000.

Shimizu, Akira; and Kaneko, Norio, to Canon Kabushiki Kaisha. Dielectric articles and condensers using the same. 4,873,610, Cl. 361-313.000.

Shimizu, Chiyuki; and Yoshida, Tamio, to Toshiba Silicone Co., Ltd. Polyether end-blocked with hydrolyzable silyl groups, method of manufacturing and room temperature curable composition using the polyether. 4,873,272, Cl. 523-212.000.

Shimizu, Shinji; Tsuchiya, Osamu; and Sato, Katsuyuki, to Hitachi, Ltd. Semiconductor memory device and a process for producing the same. 4,873,559, Cl. 357-23.600.

Shimizu, Yoshiki: *See—*
Kubo, Motonobu; and Shimizu, Yoshiki, 4,873,375, Cl. 568-812.000.

Shimohigashi, Katsuhiro: *See—*
Etoh, Jun; Shimohigashi, Katsuhiro; Miyazawa, Kazuyuki; Kimura, Katsutaka; and Akiba, Takesada, 4,873,672, Cl. 365-218.000.

Shimura, Masato: *See—*
Taketani, Noriaki; Asano, Hideki; Endo, Akira; Abe, Tomiya; Ibamoto, Masahiko; Mukai, Junji; Tanno, Seikichi; Eguchi, Shuji; and Shimura, Masato, 4,873,030, Cl. 264-1.500.

Shinoda, Kenichi; Iwao, Tomoyoshi; Isayama, Tomoaki; and Higo, Yuichi, to Nisshin Steel Co., Ltd. Vibration-damper metal sheets. 4,873,149, Cl. 428-609.000.

Shinto Paint Co., Ltd.: *See—*
Suzuki, Tameyuki; and Kamakura, Takuro, 4,873,175, Cl. 430-311.000.

Shionogi & Co., Ltd.: *See—*
Adachi, Ikuo; Yamamori, Teruo; Ueda, Motohiko; and Sato, Hatsuo, 4,873,334, Cl. 514-303.000.

Shipley Company Inc.: *See—*
Fisher, Thomas A., 4,873,176, Cl. 430-313.000.

Shipley, Larry W.: *See—*
Jankower, Laura J.; and Shipley, Larry W., 4,873,091, Cl. 424-489.000.

Shirai, Hidenobu: *See—*
Suzuki, Masafumi; and Shirai, Hidenobu, 4,872,964, Cl. 204-298.000.

Shirai, Hironobu, to Omron Tateisi Electronics Co. Input circuit having a photo-coupler with bi-directional indicator. 4,873,448, Cl. 250-551.000.

Shiraishi, Shuji; and Nishihara, Takashi, to Honda Giken Kogyo Kabushiki Kaisha. Traction control system for controlling slip of a driving wheel of a vehicle. 4,873,638, Cl. 364-426.010.

Shiraishi, Shuji: *See—*
Sato, Makoto; Shiraishi, Shuji; and Muto, Tetsuji, 4,873,639, Cl. 364-426.020.

Shiroshita, Masao: *See—*
Katoh, Tsuguhiro; Maeda, Kiyoto; Shiroshita, Masao; Yamashita, Norihisa; Sanemitsu, Yuzuru; and Inoue, Satoru, 4,873,248, Cl. 514-269.000.

Shishido, Tadao: *See—*
Ishiguro, Shoji; Hirano, Shigeo; Shishido, Tadao; and Miyake, Akio, 4,873,172, Cl. 430-264.000.

Shishikura, Takashi: *See—*
Okamoto, Shosuke; Okada, Yoshio; Okunomiya, Akiko; Naito, Taketoshi; Kimura, Yoshio; Yamada, Morihiko; Ohno, Norio; Katsuura, Yasuhiro; Nojima, Hiroshi; and Shishikura, Takashi, 4,873,253, Cl. 514-352.000.

Shitara, Tetsuo: *See—*
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Shively, John E.: *See—*
Crawford, Frances G.; Shively, John E.; Todd, Charles W.; and Yang, Y. H. Joy, 4,873,313, Cl. 530-387.000.

Shoger, Kirk D.: *See—*
Tegeler, John J.; and Shoger, Kirk D., 4,873,239, Cl. 514-227.800.

Short, Allen T.; and Wilkinson, Raleigh J., to J. R. Short Milling Company. Method for producing breakfast cereal. 4,873,110, Cl. 426-621.000.

Shoukry, Ehsan I.: *See—*
Clem, Kenneth R.; Heider, Kenneth J.; Kegerreis, James E.; and Shoukry, Ehsan I., 4,872,967, Cl. 208-65.000.

Showa Denko Kabushiki Kaisha: *See—*
Kurosawa, Shigeru; and Matsuki, Kunio, 4,873,295, Cl. 525-420.000.
Okamoto, Shosuke; Okada, Yoshio; Okunomiya, Akiko; Naito, Taketoshi; Kimura, Yoshio; Yamada, Morihiko; Ohno, Norio; Katsuura, Yasuhiro; Nojima, Hiroshi; and Shishikura, Takashi, 4,873,253, Cl. 514-352.000.

Shutske, Gregory M.; and Kapples, Kevin J., to Hoechst-Roussel Pharmaceuticals Inc. Isoxazolobenzoxazepines. 4,873,234, Cl. 514-211.000.

Shutt, Eric; Altena, Andries G.; and Jenkins, John W., to Johnson Matthey Public Limited Company. Oxidative conversion of methane to ethylene and ethane. 4,873,388, Cl. 585-500.000.

Siano, James C. Railroad tie replacement apparatus. 4,872,646, Cl. 254-43.000.

Sibigtroth, James M., to Motorola, Inc. Output compare system and method for a data processor. 4,873,624, Cl. 364-200.000.

Sibole, Wade. Segmented die. 4,872,790, Cl. 408-221.000.

Siddall, William E.: *See—*
Baratz, Alan E.; Clarke, Kathryn E.; Pollard, Melinda R.; Pozefsky, Diane P.; Rafalow, Lee M.; Siddall, William E.; and Gray, James P., 4,873,517, Cl. 340-825.030.

Sie, Swan T.; Drent, Eit; and Jager, Willem W., to Shell Oil Company. Process for the production of methanol and a composition suitable for use as a catalyst in said process. 4,873,267, Cl. 518-700.000.

Siegel, Israel. Diagnosis of free fatty acid toxicity by monitoring red blood cells morphologic changes. 4,872,752, Cl. 356-39.000.

Siemens AG: *See—*
Neulinger, Franz; Schummer, Helmut; Donig, Gerhard; and Schmidt, Walter, 4,873,620, Cl. 363-57.000.

Siemens Aktiengesellschaft: *See—*
Arnold, Kraft-Ulrich; and Clauss, Fernand, 4,873,058, Cl. 422-89.000.
Dietrich, Klaus; Hauer, Hans; and Schreier, Klaus, 4,873,521, Cl. 340-825.520.
Eckardt, Bernd, 4,873,050, Cl. 376-283.000.
Haeussler, Klaus M.; Wittmann, Julius; Gaukel, Gisela; and Auracher, Franz, 4,873,697, Cl. 372-108.000.
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Schultes, Helmut, 4,872,436, Cl. 123-339.000.
Stich-Baumeister, Eva-M.; Dohnke, Karl-Otto; and Winnacker, Albrecht, 4,872,759, Cl. 356-432.000.
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Siemens-Bendix Automotive Electronics L.P.: *See—*
Sapienza, Samuel J., IV, 4,872,426, Cl. 123-90.150.

Sigmund, Jerry A., to Scott Paper Company. Two large roll toilet tissue dispenser. 4,872,601, Cl. 225-38.000.

Sigworth, Geoffrey K., to KB Alloys, Inc. Third element additions to aluminum-titanium master alloys. 4,873,054, Cl. 420-552.000.

Sih, John C.; and Cho, Moo J., to Upjohn Company, The. N-substituted derivatives of 2-(pyridylalkenesulfinyl) benzimidazoles as gastric antisecretory agents. 4,873,337, Cl. 546-271.000.

Siissalo, Ilkka T.: *See—*
Aaltonen, Pirkko K.; and Siissalo, Ilkka T., 4,873,111, Cl. 426-623.000.

Sikora, Joseph: *See—*
Good, William R.; Mikes, John; and Sikora, Joseph, 4,873,086, Cl. 424-409.000.

Silber, Cory J.: *See—*
VanderPol, Jerald; Silber, Cory J.; and Astle, William H., 4,872,249, Cl. 29-157.400.

Silvano, Tomba; and Tomba, Giuseppe, to Brai Systems SRL. Torque-multiplying kinematic device particularly for bicycles and bicycles employing said kinematic device. 4,872,695, Cl. 280-257.000.

Silverman, Melvin K.: *See—*
Thompson, Steven L.; and Silverman, Melvin K., 4,873,077, Cl. 424-61.000.

Silvester, Lenard F.: *See—*
Chang, On-Kok; Hall, John C.; Phillips, Jeffrey; and Silvester, Lenard F., 4,873,158, Cl. 424-61.000.

Simi, David G. Vehicle position indicator. 4,873,509, Cl. 340-436.000.

Simonyi, Istvan: *See—*
Petocz, Lujza; Simonyi, Istvan; Beck, Ivan; Gigler, Gabor; Fekete, Marton; Kiszelly, Eniko ; Mandi, Attila; Gorgenyi, Frigyes; Dietz, Andras; Sumeg nee Zukovics, Katalin; and Jakfalvi, Elemer, 4,873,249, Cl. 514-275.000.

Simpson, Bruce: *See—*
Davis, Cecil J.; Abernathy, Joseph V.; Matthews, Robert T.; Hildenbrand, Randall C.; Simpson, Bruce; Jones, John I.; Loewenstein, Lee M.; and Bohlman, James G., 4,872,938, Cl. 156-345.000.

Simpson, Sharon M., to Minnesota Mining and Manufacturing Company. Supersensitization of silver halide photothermographic emulsions. 4,873,184, Cl. 430-617.000.

Sinclair, Michael J.: *See—*
Blanton, Keith A.; Finlay, William M.; Sinclair, Michael J.; and Tumblin, John E., 4,873,585, Cl. 358-335.000.

Singer, Victor, to Morton Thiokol, Inc. Rocket motor extendible nozzle exit cone. 4,872,612, Cl. 239-265.190.

Sioshansi, Piran: *See—*
Bunker, Stephen N.; and Sioshansi, Piran, 4,872,922, Cl. 148-4.000.

Sipple, Gene L. Weighted refuse container. 4,872,582, Cl. 220-1.00T.

Sivavec, Timothy M.: *See—*
Anderson, Patricia P.; Sivavec, Timothy M.; and Takekoshi, Tohru, 4,873,367, Cl. 562-425.000.

Sivers, Rolf V.: *See—*
Hawener, Juergen; Havemann, Kim; and Sivers, Rolf V., 4,872,624, Cl. 244-54.000.

Skelton, Lawrence. Method and apparatus for roofing. 4,872,331, Cl. 72-181.000.

SKF GmbH: *See—*
Brandenstein, Manfred; Haas, Roland; Friedrich, Wolfgang; and Herrmann, Gerhard, 4,872,768, Cl. 384-223.000.

Skibinski, Robert E., to Mid-America Scale, Inc. Torque suspension weighing scale. 4,872,523, Cl. 177-255.000.

Skinner, Timothy J.; Spurney, Joseph L.; and Ma, Weiming, to General Motors Corporation. Variable displacement compressor passive destroker. 4,872,814, Cl. 417-222.000.

Skowronski, Michael J.: *See—*
Hallmark, Richard K.; Skowronski, Michael J.; and Stephens, William D., 4,873,268, Cl. 521-48.500.

Sliger, Willamena. Chest protector. 4,872,215, Cl. 2-2.000.

Sloss Industries Corporation: *See—*
Hallmark, Richard K.; Skowronski, Michael J.; and Stephens, William D., 4,873,268, Cl. 521-48.500.

Smedby, Leif: *See—*
Jorstad, Storker; and Smedby, Leif, 4,872,978, Cl. 210-181.000.

Smeed, Clifford G. Spike shoe slip. 4,872,273, Cl. 36-135.000.

Smelters, Paul J.: *See—*
Irwin, George F.; Smelters, Paul J.; Robertson, David J.; and Maginley, Ronald J., 4,873,682, Cl. 370-58.100.

Smeltz, Palmer D., Jr.: *See—*
Hokanson, John L.; Smeltz, Palmer D., Jr.; Yanushefski, Katherine A.; Yanushefski, Michael J.; and Young, Craig A., 4,873,566, Cl. 357-74.000.

Smith, Benjamin L. Automatic fishhook setting device. 4,872,280, Cl. 43-15.000.

Smith, Bernard: *See—*
Branovich, Louis E.; Smith, Bernard; Freeman, Gerard L.; and Eckart, Donald W., 4,872,864, Cl. 445-50.000.
Smith, Brad L.: *See—*
Murphy, Mark A.; Smith, Brad L.; Aguilo', Adolfo; and Tau, Kwoliang D., 4,873,378, Cl. 568-867.000.
Smith, Douglas W. P., to Devron-Hercules, Inc. Dielectric cross machine moisture control. 4,873,407, Cl. 219-10.430.
Smith, Jimmy L. Hinged closure attachment for insulated beverage can container. 4,872,577, Cl. 220-85.0CH.
Smith, John M., to Nestle S.A. Universal fit intraocular lens. 4,872,876, Cl. 623-6.000.
Smith, Kristin S. Skipping rope assembly. 4,872,666, Cl. 272-75.000.
Smith, Lloyd J. Chalk dust remover. 4,872,237, Cl. 15-210.00R.
Smith & Nephew (Latin America), Inc.: *See—*
Johns, Owen L., 4,872,869, Cl. 604-342.000.
Smith, Pamela S.; and Smith, Peter H., deceased (by Smith, Pamela S., executor), to General Electric Company. Magnetron with microprocessor based feedback control. 4,873,408, Cl. 219-10.55B.
Smith, Pamela S., executor: *See—*
Smith, Pamela S.; and Smith, Peter H., deceased, 4,873,408, Cl. 219-10.55B.
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Smith, Peter J.: *See—*
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Smith, Walton J. Decreasing the toxicity of an ibuprofen salt. 4,873,231, Cl. 514-557.000.
Smith, Wayne: *See—*
Duffey, Donald; Hardee, Sellers; Smith, Wayne; Elliott, James; Gardner, Robert; and Suess, Claus, 4,872,500, Cl. 164-34.000.
Smith, William E., to EZE Products, Inc. Apparatus for improving the quality of paper manufactured from recycled paper with a hydrokinetic amplifier. 4,872,953, Cl. 162-261.000.
SmithKline Beckman Corporation: *See—*
Kaiser, Carl; Kruse, Lawrence I.; and Ross, Stephen T., 4,873,357, Cl. 558-414.000.
SNIA Fibre S.p.A.: *See—*
Ciaperoni, Aldemaro; Cappelli, Alberto; D'Andolfo, Francesco; and Salan, Antonio, 4,873,296, Cl. 525-434.000.
Sniadach, James R. Automotive sunscreen. 4,872,721, Cl. 296-97.200.
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Snow Brand Milk Products Co., Ltd.: *See—*
Deya, Eiki; Yanahira, Shuichi; Abiko, Kenkichi; and Kikuchi, Eiichi, 4,873,229, Cl. 514-54.000.
Snow, Roger: *See—*
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Societe Anonyme dite : Alsthom: *See—*
Heddebaut, Marc; Mainardi, Pierre; Degauque, Pierre; and Duhot, Denis, 4,873,531, Cl. 343-711.000.
Societe d'Exploitation de Brevets Pour l'Industrie et la Marine Sebim: *See—*
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Societe Nationale D'Etude et de Construction de Moteurs D'Aviation: *See—*
Saussier, Alain; and Sebilet, Bruno R., 4,873,699, Cl. 375-1.000.
Solco Basel: *See—*
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Somerville Packaging Corporation: *See—*
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Someya, Atsushi: *See—*
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Somfy: *See—*
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Sommer, Hans D., to Steyr-Daimler-Puch AG. Drive system for a motor vehicle comprising means for permanently driving a first pair of wheels and automatically operable means for selectively driving a second pair of wheels. 4,872,525, Cl. 180-197.000.
Sommer, Michael B.: *See—*
Bogeso, Klaus P.; and Sommer, Michael B., 4,873,344, Cl. 541-77.000.
Son, Masayoshi, to Datanet Corp. Automatic dialer. 4,873,720, Cl. 379-356.000.
Sone, Yoshinori: *See—*
Iida, Toshikatsu; Fujiwara, Takayoshi; and Sone, Yochinori, 4,872,820, Cl. 418-220.000.
Sonoco Products Company: *See—*
Dancy, Hugh G., 4,872,766, Cl. 383-10.000.
Sonoda, Hidefumi; Mori, Eiji; Kawase, Mitsuo; Yoneshige, Kazuhiro; Takahashi, Akira; Komiya, Hirokazu; and Tanaka, Akira, to Toyota Jidosha Kabushiki Kaisha; Aisan Industry Co., Ltd.; and Jeco Co.,Ltd. Device for preventing outflow of a fuel vapor from a fuel tank. 4,872,439, Cl. 123-518.000.
Sony Corporation: *See—*
Hiramatsu, Akihiko, 4,873,588, Cl. 360-47.000.
Inazawa, Yoshizumi; Yamada, Masaki; Ishibashi, Hiroshi; and Ozaki, Shinya, 4,873,589, Cl. 360-53.000.
Kume, Hidehiro; Matsumoto, Yoshiyuki; and Yoshitoshi, You, 4,873,429, Cl. 250-216.000.
Ohgihara, Takahiro; Murakami, Yoshikazu; Mizunuma, Yasuyuki; and Nakano, Hiroyuki, 4,873,496, Cl. 331-96.000.
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Sorg GmbH & Co. KG: *See—*
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Southard, James H.: *See—*
Belzer, Folkert O.; and Southard, James H., 4,873,230, Cl. 514-60.000.
Southwick, Everett W.: *See—*
Howe, Charles R.; Southwick, Everett W.; and Cox, Richard H., 4,872,917, Cl. 131-275.000.
Spanier, Henry C.: *See—*
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Spease, Arthur L., to Teleflex Incorporated. Lost motion end fitting. 4,872,367, Cl. 74-502.600.
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Fulton, Steven J.; Spehrley, Charles W., Jr.; and Young, Lawrence R., 4,873,134, Cl. 428-156.000.
Spiel, Albert A.; Roe, James; and Spanier, Henry C., to Nabisco Brands, Inc. Simulated egg treats for pets. 4,873,096, Cl. 426-72.000.
Spielman, Edgar E., Jr.: *See—*
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Spinner, Raphael F.; Marley, Clement F.; Brown, Mary; and Grant, Cathy, to Marley, Clement F. Steel knot for ropes. 4,872,240, Cl. 16-114.00B.
Spire Corporation: *See—*
Bunker, Stephen N.; and Sioshansi, Piran, 4,872,922, Cl. 148-4.000.
Spirol International Corporation: *See—*
Stearns, Ralph A., 4,872,603, Cl. 227-97.000.
Sprague, Barry N.: *See—*
Epperly, William R.; Sullivan, James C.; and Sprague, Barry N., 4,873,066, Cl. 423-235.000.
Springer, Hartmut; Kuhn, Manfred; and Buch, Holger M., to Hoechst Aktiengesellschaft. Water-soluble monoazo and disazo dyes containing a fiber-reactive 2-chloro-4-(nitrophenylamino-alkylamino)-s-triazin-6-ylamino grouping with a fiber-reactive group of the vinylsulfone series as a substituent in the nitrophenyl moiety. 4,873,320, Cl. 534-632.000.
Springfield Armory, Inc.: *See—*
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Sprout-Bauer, Inc.: *See—*
Foresman, James D., 4,872,617, Cl. 241-247.000.
Spruytenburg, Fred T.; McDonald, Charles; and Hodgetts, Michael J. Closed-loop microwave popcorn control. 4,873,409, Cl. 219-10.55M.
Spurney, Joseph L.: *See—*
Skinner, Timothy J.; Spurney, Joseph L.; and Ma, Weiming, 4,872,814, Cl. 417-222.000.
Staalkat B.V.: *See—*
van der Schoot, Jelle, 4,872,564, Cl. 209-511.000.
Stace, Christopher: *See—*
White, Henry J.; and Stace, Christopher, 4,872,742, Cl. 350-348.000.
Stack, Eugene V., to Dow Chemical Company, The. Pipe aligning apparatus. 4,872,709, Cl. 285-39.000.
Stanaway, John J., Jr.: *See—*
Davidson, Wayne A.; Ernst, John P.; Herkes, Marybeth; Kuppuswami, Ram; Satalich, Timothy A.; and Stanaway, John J., Jr., 4,873,717, Cl. 379-157.000.
Standard Concrete Products, Inc.: *See—*
Dunton, Harvey R.; and Rez, Donald H., 4,872,913, Cl. 106-88.000.
Standard Oil Company, The: *See—*
Brazdil, James F.; and Guttmann, Andrew T., 4,873,215, Cl. 502-202.000.
Stapersma, Johan, to Shell Oil Company. Nitrogen-containing bidentate compound immobilized on a solid inorganic carrier. 4,873,212, Cl. 502-158.000.
Stapersma, Johan, to Shell Oil Company. Nitrogen-containing bidentate compound immobilized on a solid inorganic carrier. 4,873,333, Cl. 546-14.000.
State of Israel, Atomic Energy Commission, Soreo Nuclear Research Center, The: *See—*
Haruvy, Yair; Katz, Moshe; and Horowitz, Abraham A., 4,872,220, Cl. 2-243.00A.

Staudt, Hans-Joachim: *See*—
Erdmann, Fritz; Thamm, Horst-Dieter; and Staudt, Hans-Joachim, 4,873,169, Cl. 430-192.000.

STC PLC: *See*—
Hunt, Rowland G., 4,873,199, Cl. 437-31.000.

Stearns, Ralph A., to Spirol International Corporation. Insert installation machine. 4,872,603, Cl. 227-97.000.

Steelcase Inc.: *See*—
Knoblock, Glenn A.; and Scolten, Brian L., 4,872,635, Cl. 248-406.200.

Steenburg, Kip V., to Prodigy Corp. Convertible carriage with biased wheel retraction. 4,872,692, Cl. 280-30.000.

Steigmaier, Alwin, to Robert Bosch GmbH. Hydraulic vehicle brake system. 4,872,732, Cl. 303-110.000.

Stephens, William D.: *See*—
Hallmark, Richard K.; Skowronski, Michael J.; and Stephens, William D., 4,873,268, Cl. 521-48.500.

Stephenson, Daniel L.: *See*—
Myers, Clyde J.; Stephenson, Daniel L.; and Travieso, Ruben, 4,872,736, Cl. 350-96.200.

Stephenson, Michael T.: *See*—
Bartels, Craig R.; Dorawala, Tansukhlal G.; Stephenson, Michael T.; Pasternak, Mordechai; and Reale, John, Jr., 4,872,991, Cl. 210-651.000.

Sterling Drug Inc.: *See*—
Weller, Jeanne M., 4,873,000, Cl. 252-8.600.

Sterman, Saul C., to Med Optics Corp. System for tinting contact lenses. 4,872,405, Cl. 101-44.000.

Stevens, Robert A.: *See*—
Proxmire, Deborah L.; Endres, Dan D.; Wilson, John C.; Johnson, Lynn A.; Zehner, Georgia L.; Boland, Leona G.; and Stevens, Robert A., 4,872,871, Cl. 604-394.000.

Stewart Decatur Security Systems, Inc.: *See*—
Bentley, Leroy, 4,872,284, Cl. 49-16.000.

Stewart II, John L.: *See*—
Shadrach III, William S.; Mandler, Michael; Moch, Ihor D.; Zitomer, Bernard; and Stewart II, John L., 4,872,555, Cl. 206-459.000.

Stewart, Joseph A.: *See*—
Mouser, Charles L.; and Stewart, Joseph A., 4,873,648, Cl. 364-500.000.

Steyr-Daimler-Puch AG: *See*—
Erhart, Erich, 4,872,489, Cl. 141-5.000.
Sommer, Hans D., 4,872,525, Cl. 180-197.000.

Stiasny, Janos G., to Club Mate Products Inc. Portable golf club head cleaner. 4,872,232, Cl. 15-21.00E.

Stich-Baumeister, Eva-M.; Dohnke, Karl-Otto; and Winnacker, Albrecht, to Siemens Aktiengesellschaft. Sensor for gases or ions. 4,872,759, Cl. 356-432.000.

Stingelin, Willy, to Ciba-Geigy Corporation. Disazo dyes containing a pyrimidine coupling component and a cationic alkyl ammonium group. 4,873,319, Cl. 534-604.000.

STK Ceramics Laboratory Corp.: *See*—
Matsushita, Junichi; Saito, Hajime; and Nagashima, Hideo, 4,873,053, Cl. 419-11.000.

Stone, Eugene E., III. Reenforced pant structure. 4,872,221, Cl. 2-404.000.

Stoner, Eugene M., to Ares, Inc. Gun for firing telescoped ammunition, plus searing means. 4,872,391, Cl. 89-155.000.

Stoops, John F., to Tektronix, Inc. Digital Correction of linear system distortion. 4,873,646, Cl. 364-487.000.

Stou, Toshio: *See*—
Minagawa, Takehiro; Stou, Toshio; Miyata, Masao; Nemoto, Kenji; and Uchida, Kuninobu, 4,872,793, Cl. 409-244.000.

Strand, Timothy C.: *See*—
Juliana, Anthony; Leung, Wai C.; Pan, Victor T.; Rosen, Hal J.; and Strand, Timothy C., 4,873,430, Cl. 250-225.000.

Stranges, Frank. Dual purpose carrying container. 4,872,550, Cl. 206-315.100.

Stratoflex, Inc.: *See*—
Konecny, James W.; Huston, Rodney L.; and Vyse, Gerrard N., 4,872,710, Cl. 285-81.000.

Stratton, Lawrence J.: *See*—
Dean, Thomas E.; Henrich, William H.; Fischer, David M.; Stratton, Lawrence J.; and Pietsch, Herbert E., 4,873,471, Cl. 315-308.000.

Streich, Herbert K.; Leach, Robert D.; Johnson, Joel R.; Olson, Thomas B.; and Townsend, Donald L., to Arvin Industries, Inc. Wall mounted heater with plug mount and support. 4,873,422, Cl. 219-370.000.

Streichenberger, Rodolphe. Artificial substrates for marine biomass enhancement and wave energy absorption. 4,872,782, Cl. 405-24.000.

Streicher, Willi: *See*—
Behre, Horst; Blank, Heinz U.; Marzolph, Gerhard; and Streicher, Willi, 4,873,026, Cl. 562-72.000.

Stringfellow, William T.; Goldsmith, Charles D.; and Davis, Lois T., to Sybron Chemicals, Inc. Use of bacteria for control of algal bloom in wastewater, lagoons, or ponds. 4,872,986, Cl. 210-611.000.

Stroms, Karl F., to International Business Machines Corp. Programmable magnetic repulsion punching apparatus. 4,872,381, Cl. 83-76.100.

Struck, Bernd D.; Neumeister, Herbert; and Naoumidis, Aristides, to Kernforschungsaniage Julich GmbH. Cathode/membrane assembly and method of making same. 4,873,121, Cl. 427-77.000.

Strum, Josep; and Prange, Wilfried, to Thyssen Stahl Aktiengesellschaft. Apparatus for the continuous welding of strips and/or sheets. 4,872,940, Cl. 156-379.800.

Stryker Corporation: *See*—
Brennan, Thomas J.; and Evans, James A., 4,873,461, Cl. 310-47.000.

Stumpp, Michael: *See*—
Schaefer, Gerhard; Eilingsfeld, Heinz; Neumann, Peter; and Stumpp, Michael, 4,873,372, Cl. 568-34.000.

Sturm, Michael. Exhaust gas turbine connected to engine output. 4,872,311, Cl. 60-615.000.

Sudo, Michitaka: *See*—
Kawasaki, Yoshiki; Hioki, Yoshihiro; Ohno, Yuichi; Ichida, Kozaburo; Yamaguchi, Susumu; Sudo, Michitaka; and Chikazawa, Bunichiro, 4,872,245, Cl. 29-81.00A.

Sueoka, Kuniaki, to International Business Machines Corporation. Magnetic head assembly for perpendicular magnetic recording. 4,873,599, Cl. 360-126.000.

Suess, Claus: *See*—
Duffey, Donald; Hardee, Sellers; Smith, Wayne; Elliott, James; Gardner, Robert; and Suess, Claus, 4,872,500, Cl. 164-34.000.

Suga, Shuzo: *See*—
Miyasaka, Nobuaki; and Suga, Shuzo, 4,873,181, Cl. 430-523.000.

Suganami, Takuya: *See*—
Kazumoto, Yoshio; Suganami, Takuya; Furuishi, Yoshiro; and Kashiwamura, Kazuo, 4,872,313, Cl. 62-6.000.

Sugawa, Etsuko: *See*—
Haruta, Masahiro; Kuwae, Yoko; Munakata, Hirohide; Yuasa, Satoshi; and Sugawa, Etsuko, 4,873,178, Cl. 430-327.000.

Sugimoto, Kenichi: *See*—
Morishita, Masataka; Aikawa, Renji; Katsuragi, Shigeo; Yamamoto, Yoshiaki; and Sugimoto, Kenichi, 4,873,087, Cl. 424-433.000.

Sugimura, Kazuo: *See*—
Sugimura, Nobuyuki; and Sugimura, Kazuo, 4,872,486, Cl. 138-30.000.

Sugimura, Nobuyuki; and Sugimura, Kazuo. Accumulator having inclined communication holes. 4,872,486, Cl. 138-30.000.

Sugino, Yasuo: *See*—
Wakabayashi, Minoru; Murata, Hiroyuki; Sugino, Yasuo; Yamao, Masanobu; and Nishikawa, Takao, 4,872,972, Cl. 209-143.000.

Suling, Carlhans: *See*—
Lindner, Christian; Wittmann, Dieter; Trabert, Ludwig; Suling, Carlhans; Bartl, Herbert; and Ott, Karl-Heinz, 4,873,289, Cl. 525-293.000.

Sullivan, James C.: *See*—
Epperly, William R.; Sullivan, James C.; and Sprague, Barry N., 4,873,066, Cl. 423-235.000.

Sullivan, Mark: *See*—
Salz, Gilbert; and Sullivan, Mark, 4,872,462, Cl. 128-842.000.

Sullivan, Michael C. Air ratchet holder. 4,872,633, Cl. 248-340.000.

Sulzer Brother Limited: *See*—
Riesen, Peter, 4,872,487, Cl. 139-185.000.

Sumeg nee Zukovics, Katalin: *See*—
Petocz, Lujza; Simonyi, Istvan; Beck, Ivan; Gigler, Gabor; Fekete, Marton; Kiszelly, Eniko ; Mandi, Attila; Gorgenyi, Frigyes; Dietz, Andras; Sumeg nee Zukovics, Katalin; and Jakfalvi, Elemer, 4,873,249, Cl. 514-275.000.

Sumita, Hiroshi: *See*—
Takedoi, Atsushi; Kondo, Hiroyuki; Isoai, Masaru; Yoshinaga, Yoshitaka; Harada, Tosiharu; Okuda, Yosiro; Sumita, Hiroshi; Kawasaki, Hirofumi; and Mori, Kohji, 4,873,010, Cl. 252-62.590.

Sumitomo Chemical Co., Ltd.: *See*—
Katoh, Tsuguhiro; Maeda, Kiyoto; Shiroshita, Masao; Yamashita, Norihisa; Sanemitsu, Yuzuru; and Inoue, Satoru, 4,873,248, Cl. 514-269.000.
Masui, Syohei; Matsumoto, Masahito; and Usui, Nobuhiro, 4,873,041, Cl. 264-135.000.
Omura, Takashi; Kikkawa, Sadanobu; Morimitsu, Toshihiko; Harada, Naoki; and Miyamoto, Tetsuya, 4,873,321, Cl. 534-642.000.

Sumitomo Electric Industries, Ltd.: *See*—
Kotani, Toshihiro; and Tada, Kohji, 4,873,062, Cl. 422-249.000.
Saen, Haruo; and Kobayashi, Kougi, 4,873,411, Cl. 219-93.000.

Summa, William J.: *See*—
Canestaro, Michael J.; and Summa, William J., 4,873,123, Cl. 427-96.000.

Summers, James B., Jr.; Gunn, Bruce P.; and Brooks, Dee W., to Abbott Laboratories. Indole, benzofuran, benzothiophene containing lipoxygenase inhibiting compounds. 4,873,259, Cl. 514-443.000.

Sun Chemical Corporation: *See*—
Latosky, Joseph A., 4,872,916, Cl. 106-503.000.

Sun, Donald J. C. Golf club head with impact insert member. 4,872,685, Cl. 273-169.000.

Sunami, Hideo; Kimura, Shinichiro; and Kaga, Toru, to Hitachi, Ltd. Dynamic random access memory having buried word lines. 4,873,560, Cl. 357-23.600.

Sunami, Hideo: *See*—
Kaga, Toru; Kimura, Shinichiro; Kure, Tokuo; Kawamoto, Yoshifumi; and Sunami, Hideo, 4,873,203, Cl. 437-67.000.

Sundstrand Data Control, Inc.: *See*—
Hanson, Richard A.; Peters, Rex B.; Norling, Brian L.; and Urbach, Edward A., 4,872,342, Cl. 73-517.00R.
Peters, Rex B.; and Cornelius, Craig J., 4,872,343, Cl. 73-517.0AV.

Sunshine Biscuits, Inc.: *See*—
Shadrach III, William S.; Mandler, Michael; Moch, Ihor D.; Zitomer, Bernard; and Stewart II, John L., 4,872,555, Cl. 206-459.000.

Suntory Limited: *See—*
Tanaka, Takaharu; Saitoh, Masayuki; Higuchi, Naoki; and Hashimoto, Masaki, 4,873,342, Cl. 548-518.000.

Sussmeier, John, to Perkin-Elmer Corporation, The. Desiccant system. 4,872,891, Cl. 55-387.000.

Suter, Erwin: *See—*
Robertson, Peter M.; and Suter, Erwin, 4,873,057, Cl. 422-75.000.

Sutherland, Deborah S.: *See—*
Tomczuk, Bruce E.; and Sutherland, Deborah S., 4,873,251, Cl. 514-303.000.

Suzuki, Hideaki: *See—*
Takagi, Kozi; Ido, Noriyuki; Ohno, Sadayuki; Suzuki, Hideaki; Inoue, Yoshiaki; and Nomura, Yoshihisa, 4,872,730, Cl. 303-92.000.

Suzuki, Koji; Tsukada, Tetsuro; Saito, Yoshihiko; Arai, Kiyotaka; and Mori, Hiroshi, to Asahi Glass Company, Ltd. Ion exchange membrane for electrolysis. 4,872,958, Cl. 204-98.000.

Suzuki, Masafumi; and Shirai, Hidenobu, to Fujitsu Limited. Planar magnetron sputtering apparatus and its magnetic source. 4,872,964, Cl. 204-298.000.

Suzuki, Masato: *See—*
Horiuchi, Kotaro; and Suzuki, Masato, 4,872,805, Cl. 415-7.000.
Tobita, Toshimitsu; Inaba, Hiromi; Yamazaki, Masachika; Suzuki, Masato; Morita, Yuzo; Kajiyama, Toshiki; Nakamura, Kiyoshi; and Yoneda, Kenji, 4,872,532, Cl. 187-121.000.

Suzuki, Masayuki: *See—*
Baba, Takeshi; Matsuoka, Kazuhiko; Usui, Masayuki; Minoura, Kazuo; Someya, Atsushi; and Suzuki, Masayuki, 4,872,743, Cl. 350-353.000.

Suzuki, Takahire: *See—*
Matsumura, Shuzo; Mizuno, Takanori; Aoki, Noboru; and Suzuki, Takahire, 4,873,466, Cl. 313-131.00R.

Suzuki, Takamichi: *See—*
Sato, Hiroshi; Ohashi, Toshijiro; Hamada, Toyohide; Umakoshi, Yukimori; Suzuki, Takamichi; Wada, Yuuji; Hara, Shigeo; and Fukumoto, Youshuke, 4,872,618, Cl. 242-4.00R.

Suzuki, Takao: *See—*
Asano, Katuhiko; and Suzuki, Takao, 4,872,314, Cl. 62-49.100.

Suzuki, Tameyuki; and Kamakura, Takuro, to Shinto Paint Co., Ltd. Method of forming functional coating film between fine electric conductive circuits. 4,873,175, Cl. 430-311.000.

Suzuki, Tatsuo; and Isono, Keinosuke, to Material Engineering Technology Laboratory, Incorporated. Medical fluid-filled plastic container and methods of making same. 4,872,553, Cl. 206-524.400.

Suzuki, Tetsuo: *See—*
Kaji, Kichiro; Shimasaki, Katsunori; Yamamoto, Masakazu; Saiki, Kozo; Yura, Keita; Habata, Hidetsugu; Kimura, Isao; and Suzuki, Tetsuo, 4,873,070, Cl. 423-345.000.

Suzuki, Yasumichi; Ikeda, Yoshinori; Katoh, Koichi; Ohnishi, Tetsuya; Kadowaki, Toshihiro; and Honma, Toshio, to Canon Kabushiki Kaisha. Color image processing apparatus for selectively altering image colors. 4,873,570, Cl. 358-80.000.

Suzuoki, Tsutomu: *See—*
Niwa, Katuhiro; Abe, Nobuyasu; Kajikiyo, Katuji; Suzuoki, Tsutomu; Tabuti, Katumi; and Arii, Yoshifumi, 4,872,383, Cl. 83-175.000.

Swan, Ellen L.; Basu, Rajat S.; Lund, Earl A. E.; and Wilson, David P., to Allied-Signal Inc. Azeotrope-like compositions of 1,1,2-trichloro-1,2,2-trifluoroethane, methanol, nitromethane and dimethoxymethane. 4,873,015, Cl. 252-171.000.

Swanboard Masonite AB: *See—*
Alsterhall, Lars, 4,872,952, Cl. 162-152.000.

Swarthoff, Ton: *See—*
Thom, David; Swarthoff, Ton; and Maat, Jan, 4,873,016, Cl. 252-174.120.

Sweeney, Michael B.: *See—*
Pless, Benjamin D.; and Sweeney, Michael B., 4,872,459, Cl. 128-419.0PG.

Sybron Chemicals, Inc.: *See—*
Greco, William J., Jr., 4,873,611, Cl. 361-315.000.
Stringfellow, William T.; Goldsmith, Charles D.; and Davis, Lois T., 4,872,986, Cl. 210-611.000.

Synectics, Inc.: *See—*
Daleo, Stephen L.; and Compton, James B., 4,873,563, Cl. 357-41.000.

Syntex: *See—*
Krantz, Alexander; and Young, John M., 4,873,232, Cl. 514-159.000.

Syntex (U.S.A.) Inc.: *See—*
Muchowski, Joseph M.; and Greenhouse, Robert, 4,873,340, Cl. 548-453.000.

Szafranski, Pierre, to Salomon, S.A. Ski brake associated with a ski binding. 4,872,698, Cl. 280-605.000.

Szasz, Tibor: *See—*
Wittmann, Heinz; Erdei, Roland; and Szasz, Tibor, 4,872,272, Cl. 36-117.000.

Szczesny, David S.: *See—*
Grebe, Robert K.; Lucius, John E.; and Szczesny, David S., 4,872,844, Cl. 439-69.000.

Szilagyi, Imre; Dekany, Gyula; Frank, Judit; Horvath, Gabor; and Kulcsar, Gabor, to Chinoin Gyogyszer es Vegyeszeti Termekek Gyara R.T. Oxypricin, a new antibiotic. 4,873,348, Cl. 549-271.000.

Szoka, Francis: *See—*
Mayhew, Eric; Ehrke, M. Jane; Mace, Kenneth; Szoka, Francis; and Olson, Fred C., 4,873,088, Cl. 424-450.000.

Szwerc, Joseph A.: *See—*
Fazzolare, Richard D.; Szwerc, Joseph A.; and McFeaters, Rich, 4,873,093, Cl. 426-28.000.

Tabata, Toshiyuki; Ishiyama, Tatsuro; Ushijima, Takao; and Dan, Takuya, to Nissan Motor Co., Ltd.; and Bridgestone Corporation. Vibration insulating device. 4,872,650, Cl. 267-140.100.

Tabuti, Katumi: *See—*
Niwa, Katuhiro; Abe, Nobuyasu; Kajikiyo, Katuji; Suzuoki, Tsutomu; Tabuti, Katumi; and Arii, Yoshifumi, 4,872,383, Cl. 83-175.000.

Tachi-S Co. Ltd.: *See—*
Urai, Muneharu, 4,873,036, Cl. 264-46.600.

Tachibana, Daisuke: *See—*
Okada, Takeji; Sawaide, Minoru; Imai, Minoru; and Tachibana, Daisuke, 4,873,145, Cl. 428-407.000.

Tachibana, Kimie; Kaneko, Yutaka; and Ishii, Fumio, to Konica Corporation. Silver halide color photographic light-sensitive material containing pyrazoloazole type cyan coupler. 4,873,183, Cl. 430-550.000.

Tada, Kohji: *See—*
Kotani, Toshihiro; and Tada, Kohji, 4,873,062, Cl. 422-249.000.

Tada, Tetsuo; and Yamada, Tsuyoshi, to Mitsubishi Denki Kabushiki Kaisha. Test assist circuit for a semiconductor device providing fault isolation. 4,873,686, Cl. 371-22.400.

Tada, Tomio; Hirobe, Junichi; Takamatsu, Junichi; Hori, Kazuto; and Aikawa, Yukihiro, to Mita Industrial Co., Ltd. Device for detecting the life of an image forming process unit, opening of a seal of the unit and attachment of the unit to an image forming apparatus. 4,873,549, Cl. 355-206.000.

Tada, Yasuji: *See—*
Yukawa, Isao; and Tada, Yasuji, 4,872,289, Cl. 51-5.00R.

Tagawa, Takashi: *See—*
Hattori, Shuzo; Tagawa, Takashi; and Asano, Motomu, 4,873,709, Cl. 378-142.000.

Tagesson, Bernt: *See—*
Nilsson, Mats; Tagesson, Bernt; and Novak, Ladislav, 4,872,506, Cl. 165-166.000.

Taguchi, Katsuhiko; and Mitsumori, Kazuya, to JUKI Corporation. Apparatus for positioning a magnetic disk on a disk drive. 4,873,595, Cl. 360-99.050.

Taguchi, Katsuyuki: *See—*
Ishiwata, Tetsuo; and Taguchi, Katsuyuki, 4,873,590, Cl. 360-73.140.

Taguchi, Keiji: *See—*
Satoh, Motohiro; Yamada, Toshihiro; Kohono, Akiomi; Yamamoto, Akihiko; Taguchi, Keiji; Daikoku, Takahiro; and Kobayashi, Fumiuki, 4,872,606, Cl. 228-121.000.

Taheri, Syde A. Method and apparatus for transarterial aortic graft insertion and implantation. 4,872,874, Cl. 623-1.000.

Tajika, Hiroshi: *See—*
Tajima, Hatsuo; Hosoi, Atsushi; Hoshika, Norihisa; Tajika, Hiroshi; and Kinoshita, Masahide, 4,873,551, Cl. 355-251.000.

Tajima, Hatsuo; Hosoi, Atsushi; Hoshika, Norihisa; Tajika, Hiroshi; and Kinoshita, Masahide, to Canon Kabushiki Kaisha. Developing apparatus using magnetic carrier under AC field. 4,873,551, Cl. 355-251.000.

Takacs, Dezso : *See—*
Winnerl, Josef; and Takacs, Dezso , 4,873,668, Cl. 365-189.090.

Takagi, Akinobu: *See—*
Umemoto, Mitsumasa; Asano, Tamotsu; Horie, Hironobu; Takagi, Akinobu; Tamura, Nobuyasu; and Nishida, Takeshi, 4,873,373, Cl. 568-637.000.

Takagi, Kozi; Ido, Noriyuki; Ohno, Sadayuki; Suzuki, Hideaki; Inoue, Yoshiaki; and Nomura, Yoshihisa, to Nippondenso Co., Ltd.; and Toyota Jidosha Kabushiki Kaisha. Braking control apparatus for use in motor vehicle. 4,872,730, Cl. 303-92.000.

Takagi, Yasushi: *See—*
Umezawa, Sumio; Tsuchiya, Tsutomu; Takeuchi, Tomio; Umezawa, Kazuo; Takahashi, Yoshiaki; Shitara, Tetsuo; Kobayashi, Yoshihiko; and Takagi, Yasushi, 4,873,225, Cl. 514-41.000.

Takahashi, Akira: *See—*
Sonoda, Hidefumi; Mori, Eiji; Kawase, Mitsuo; Yoneshige, Kazuhiro; Takahashi, Akira; Komiya, Hirokazu; and Tanaka, Akira, 4,872,439, Cl. 123-518.000.

Takahashi, Hideharu: *See—*
Hasegawa, Junichi; and Takahashi, Hideharu, 4,872,858, Cl. 440-38.000.

Takahashi, Susumu, to Kanto Yakin Kogyo Kabushiki Kaisha. High temperature heating furnace. 4,873,423, Cl. 219-390.000.

Takahashi, Yoshiaki: *See—*
Umezawa, Sumio; Tsuchiya, Tsutomu; Takeuchi, Tomio; Umezawa, Kazuo; Takahashi, Yoshiaki; Shitara, Tetsuo; Kobayashi, Yoshihiko; and Takagi, Yasushi, 4,873,225, Cl. 514-41.000.

Takahaski, Kenji: *See—*
Hosoi, Yuichi; and Takahaski, Kenji, 4,873,438, Cl. 250-327.200.

Takahata, Toshio: *See—*
Nagaishi, Hatsuo; Seimiya, Yasuo; Tamura, Hideyuki; Miwa, Hiromichi; Sanbuichi, Hiroshi; Uchida, Masaaki; and Takahata, Toshio, 4,873,641, Cl. 364-431.040.

Takai, Kazuhiko, to Sanden Corporation. Slant plate type compressor with variable displacement mechanism. 4,872,815, Cl. 417-222.000.

Takai, Masaoki: *See—*
Kobayashi, Hirokazu; Miyamoto, Yukihiko; Takai, Masaoki; Fujisawa, Syuichi; and Miyazawa, Hiroshi, 4,873,684, Cl. 370-102.000.

Takamatsu, Junichi: *See*—
Tada, Tomio; Hirobe, Junichi; Takamatsu, Junichi; Hori, Kazuto; and Aikawa, Yukihiro, 4,873,549, Cl. 355-206.000.

Takami, Akira, to Mitsubishi Denki Kabushiki Kaisha. Rotary pump having alternating pistons controlled by non-circular gears. 4,872,818, Cl. 418-36.000.

Takao, Shoichi: *See*—
Tsubakimoto, Tsuneo; Ito, Hayami; Tatsumi, Shuhei; Kajibata, Yoshihiro; Takao, Shoichi; Goto, Takakiyo; Nakaishi, Akio; Rakutani, Kenji; Tamura, Toshio; and Kobayashi, Hiroya, 4,872,885, Cl. 44-51.000.

Takaoka, Kazuchiyo: *See*—
Senga, Takao; Takaoka, Kazuchiyo; Yamamoto, Hirokazu; and Hashimoto, Takimi, 4,873,166, Cl. 430-137.000.

Takashima, Hideyuki: *See*—
Fukahori, Toshio; Takashima, Hideyuki; and Morinaga, Hitoshi, 4,872,737, Cl. 350-96.200.

Takasugi, Syunji: *See*—
Yasukawa, Wataru, deceased; Kiyoshige, Masanori; Horikawa, Takeshi; Okada, Tomonobu; Ochi, Tadafumi; Aoki, Yoshiaki; Higashida, Masahiko; Kawashima, Takashi; Koe, Shigeki; Ono, Hideo; Nihei, Kanta; Takasugi, Syunji; and Take, Koji, 4,872,293, Cl. 51-410.000.

Takaya, Yoshikazu: *See*—
Nishinoiri, Hiroshi; Saikawa, Masahiko; Takaya, Yoshikazu; and Kanada, Euji, 4,873,170, Cl. 430-204.000.

Takayama, Syuichi: *See*—
Kanehira, Katsuyaki; Takayama, Syuichi; Amano, Atsushi; Hibino, Hiroki; Uchiyama, Naoki; and Nakada, Akio, 4,872,458, Cl. 128-401.000.

Take, Koji: *See*—
Yasukawa, Wataru, deceased; Kiyoshige, Masanori; Horikawa, Takeshi; Okada, Tomonobu; Ochi, Tadafumi; Aoki, Yoshiaki; Higashida, Masahiko; Kawashima, Takashi; Koe, Shigeki; Ono, Hideo; Nihei, Kanta; Takasugi, Syunji; and Take, Koji, 4,872,293, Cl. 51-410.000.

Takeda Chemical Industries, Ltd.: *See*—
Aoki, Isao; Kuragano, Takashi; Okajima, Nobuyuki; and Okada, Yoshiyuki, 4,872,901, Cl. 71-90.000.

Takedoi, Atsushi; Kondo, Hiroyuki; Isoai, Masaru; Yoshinaga, Yoshitaka; Harada, Tosiharu; Okuda, Yosiro; Sumita, Hiroshi; Kawasaki, Hirofumi; and Mori, Kohji, to Toda Kogyo Corp. Spindle-like magnetic iron oxide particles and process for producing the same. 4,873,010, Cl. 252-62.590.

Takehara, Kimio: *See*—
Koshihara, Toshio; Misawa, Rokurou; Sagawa, Yuzo; Takehara, Kimio; Matoba, Yuji; and Ishihara, Koji, 4,872,762, Cl. 374-5.000.

Takekoshi, Tohru: *See*—
Anderson, Patricia P.; Sivavec, Timothy M.; and Takekoshi, Tohru, 4,873,367, Cl. 562-425.000.

Taketani, Noriaki; Asano, Hideki; Endo, Akira; Abe, Tomiya; Ibamoto, Masahiko; Mukai, Junji; Tanno, Seikichi; Eguchi, Shuji; and Shimura, Masato, to Hitachi, Ltd.; and Hitachi Cable, Ltd. Method of molding a resinous optical transmitting element. 4,873,030, Cl. 264-1.500.

Takeuchi, Akihiko; and Tomoyuki, Yoji, to Canon Kabushiki Kaisha. Image processing apparatus using conversion means. 4,873,428, Cl. 250-214.0DC.

Takeuchi, Akihiro: *See*—
Kobayashi, Masaaki; Yamanishi, kazuhiro; Takeuchi, Akihiro; and Nagaoka, Yoshitomi, 4,873,583, Cl. 358-310.000.

Takeuchi, Hiroyuki: *See*—
Serita, Tamio; and Takeuchi, Hiroyuki, 4,873,039, Cl. 264-65.000.

Takeuchi, Mikio; Nakano, Kinichiro; Mitamura, Kenichi; and Tomoda, Takahisa, to Nissan Motor Co., Ltd. Antenna device in automotive keyless entry system. 4,873,530, Cl. 343-711.000.

Takeuchi, Tomio: *See*—
Umezawa, Sumio; Tsuchiya, Tsutomu; Takeuchi, Tomio; Umezawa, Kazuo; Takahashi, Yoshiaki; Shitara, Tetsuo; Kobayashi, Yoshihiko; and Takagi, Yasushi, 4,873,225, Cl. 514-41.000.

Talroy, Robert C.; Ward, Sarah G.; and Schmidt, Parbury P., to Delta Metals, Inc. Method of inhibiting herpetic lesions by the use of platinum coordination compounds. 4,873,226, Cl. 514-46.000.

Tama Chemicals Co., Ltd.: *See*—
Itou, Takeo; Matsuda, Hidemi; Yoshizako, Mamoru; and Yagi, Osamu, 4,873,120, Cl. 427-64.000.

Tamashima, Atsuzo: *See*—
Masujima, Sho; Yagi, Hiroshi; Tamashima, Atsuzo; and Tamashima, Jun, 4,873,397, Cl. 174-117.00A.

Tamashima, Jun: *See*—
Masujima, Sho; Yagi, Hiroshi; Tamashima, Atsuzo; and Tamashima, Jun, 4,873,397, Cl. 174-117.00A.

Tamura, Hideyuki: *See*—
Nagaishi, Hatsuo; Seimiya, Yasuo; Tamura, Hideyuki; Miwa, Hiromichi; Sanbuichi, Hiroshi; Uchida, Masaaki; and Takahata, Toshio, 4,873,641, Cl. 364-431.040.

Tamura, Nobuyasu: *See*—
Umemoto, Mitsumasa; Asano, Tamotsu; Horie, Hironobu; Takagi, Akinobu; Tamura, Nobuyasu; and Nishida, Takeshi, 4,873,373, Cl. 568-637.000.

Tamura, Toshio: *See*—
Tsubakimoto, Tsuneo; Ito, Hayami; Tatsumi, Shuhei; Kajibata, Yoshihiro; Takao, Shoichi; Goto, Takakiyo; Nakaishi, Akio; Rakutani, Kenji; Tamura, Toshio; and Kobayashi, Hiroya, 4,872,885, Cl. 44-51.000.

Tan, William, to Motorola, Inc. Antenna system for a wrist carried paging receiver. 4,873,527, Cl. 343-718.000.

Tanaka, Akira: *See*—
Sonoda, Hidefumi; Mori, Eiji; Kawase, Mitsuo; Yoneshige, Kazuhiro; Takahashi, Akira; Komiya, Hirokazu; and Tanaka, Akira, 4,872,439, Cl. 123-518.000.

Tanaka, Hatsuyuki; Sato, Yoshiyuki; Kohara, Hidekatsu; and Nakayama, Toshimasa, to Tokyo Ohka Kogyo Co., Ltd. Method for forming a resist pattern on a substrate surface and a scum-remover therefor. 4,873,177, Cl. 430-326.000.

Tanaka, Hiroshi: *See*—
Yato, Tadao; Hagino, Sadaaki; and Tanaka, Hiroshi, 4,873,031, Cl. 264-0.500.

Tanaka, Kojii, to Japan Exlan Company Limited. Water-swellable fiber. 4,873,143, Cl. 428-373.000.

Tanaka, Masanao: *See*—
Hattori, Tsuyoshi; Tanaka, Masanao; and Matsuzaka, Syoji, 4,873,576, Cl. 358-224.000.

Tanaka, Masashi: *See*—
Kubo, Yoshimasa; Hondo, Masao; Tanaka, Masashi; and Asahi, Akihiko, 4,873,195, Cl. 435-254.000.

Tanaka, Seizo, to Mitsubishi Denki Kabushiki Kaisha. Device for forecasting breakage cables in an industrial robot. 4,873,511, Cl. 340-677.000.

Tanaka, Takaharu; Saitoh, Masayuki; Higuchi, Naoki; and Hashimoto, Masaki, to Suntory Limited. Dipeptide derivative and synthesis and use thereof. 4,873,342, Cl. 548-518.000.

Tanaka, Yasunori; and Hashimoto, Hideo, to Kabushiki Kaisha Toshiba; and Tosbac Computer System Co., Ltd. Complementary semiconductor memory device with pull-up and pull down. 4,873,670, Cl. 365-189.110.

Tanaka, Yoshihiro; Tsuji, Sadafusa; Hata, Yoshiaki; Inoue, Manabu; Ootsuka, Hiroshi; Iwata, Michihiro; Ishito, Fumiaki; and Hayama, Koh, to Minolta Camera Kabushiki Kaisha. Photographic camera having a piezo-electric actuating element. 4,873,544, Cl. 354-457.000.

Tanaka, Yukitaka; Omura, Hisao; Irinatsu, Yuuichi; Kobayashi, Takashi; and Noguchi, Aiko, to Kao Corporation. Cacao buttern substitute composition. 4,873,109, Cl. 426-607.000.

Tanno, Seikichi: *See*—
Taketani, Noriaki; Asano, Hideki; Endo, Akira; Abe, Tomiya; Ibamoto, Masahiko; Mukai, Junji; Tanno, Seikichi; Eguchi, Shuji; and Shimura, Masato, 4,873,030, Cl. 264-1.500.

Tao, Muneo: *See*—
Fujimoto, Masayuki; Tao, Muneo; and Uchida, Kuniaki, 4,872,831, Cl. 431-73.000.

Tapping, Ronald E.: *See*—
Enright, Philip G.; Hobbis, Andrew J.; and Tapping, Ronald E., 4,872,908, Cl. 75-68.00R.

Tateyama, Masayuki: *See*—
Togo, Sigeru; Saito, Yoichi; Tateyama, Masayuki; Okuma, Genji; and Miyazaki, Hiroya, 4,873,475, Cl. 318-489.000.

Tatsumi, Shuhei: *See*—
Tsubakimoto, Tsuneo; Ito, Hayami; Tatsumi, Shuhei; Kajibata, Yoshihiro; Takao, Shoichi; Goto, Takakiyo; Nakaishi, Akio; Rakutani, Kenji; Tamura, Toshio; and Kobayashi, Hiroya, 4,872,885, Cl. 44-51.000.

Tau, Kwoliang D.: *See*—
Murphy, Mark A.; Smith, Brad L.; Aguilo', Adolfo; and Tau, Kwoliang D., 4,873,378, Cl. 568-867.000.

Taub, Floyd, to Digene Diagnostics, Incorporated. Bifunctional DNA-protein conjugating agent. 4,873,187, Cl. 435-5.000.

Taylor, John A., to Separation Dynamics, Inc. Composite semipermeable membranes and method of making same. 4,872,982, Cl. 210-490.000.

Taylor, Lloyd D.: *See*—
George, Louis J.; and Taylor, Lloyd D., 4,873,171, Cl. 430-213.000.

Taylor, Paul D.: *See*—
Liu, Kou-Chang; and Taylor, Paul D., 4,873,336, Cl. 546-243.000.

TDK Corporation: *See*—
Masujima, Sho; Yagi, Hiroshi; Tamashima, Atsuzo; and Tamashima, Jun, 4,873,397, Cl. 174-117.00A.

Team Incorporated: *See*—
Bori, Jacques E. F., 4,872,840, Cl. 433-173.000.

Techno-Frontier Ltd.: *See*—
Kobayashi, Hiroshi; Kobayashi, Masae; and Machida, Haruhiko, 4,872,445, Cl. 126-376.000.

Technometal Gesellschaft fur Metalltechnologie mbH: *See*—
Holtermann, Heinz; and Luven, Arno, 4,872,648, Cl. 266-275.000.

Techsonic Industries, Inc.: *See*—
Bailey, James B.; Gibson, Robert R.; Nunley, Alvin, III; and Utz, Q. Wayne, 4,873,676, Cl. 367-98.000.

Tecnol, Inc.: *See*—
Hubbard, Vance M.; and Brunson, Welton K., 4,872,599, Cl. 224-208.000.

Tecnoma: *See*—
Ballu, Patrick, 4,872,467, Cl. 134-104.200.

Tedham, Thomas A.; and Leung, See C., to Wang Laboratories, Inc. Multi-position base for supporting a cabinet. 4,872,733, Cl. 312-255.000.

Tegawa, Masao: *See*—
Kuwabara, Takasi; Yoshiji, Takeo; and Tegawa, Masao, 4,872,417, Cl. 118-411.000.

Tegeler, John J.; and Shoger, Kirk D., to Hoechst-Roussel Pharmaceuticals, Inc. Arylthiadiazolylsulfonamides and derivatives. 4,873,239, Cl. 514-227.800.

Teirlinck, Didier, to Cegedur Societe de Transformation de l'Aluminium Pechiney. Sheets of aluminium alloy containing magnesium, suitable for producing bodies of cans by drawing and ironing, and method of obtaining said sheets. 4,872,921, Cl. 148-2.000.

Tektronix, Inc.: *See*—
Oliaar, Ronald A.; and Knierim, Daniel G., 4,873,456, Cl. 307-272.100.
Sanielevici, Sergio A., 4,873,457, Cl. 307-353.000.
Stoops, John F., 4,873,646, Cl. 364-487.000.

Teledyne Industries, Inc.: *See*—
Dalbke, Gary R., 4,872,777, Cl. 401-199.000.

Teleflex Incorporated: *See*—
Spease, Arthur L., 4,872,367, Cl. 74-502.600.
Wolf, Jeffrey, 4,872,365, Cl. 74-501.600.

Teles De Menezes, Antonio, Junior. Wind turbine having combination wind deflecting and frame orienting means as well as dual rudders. 4,872,804, Cl. 415-2.100.

Temkin, Henryk: *See*—
Antreasyan, Arsam; Garbinski, Paul A.; Mattera, Vincent D., Jr.; and Temkin, Henryk, 4,873,558, Cl. 357-23.200.

Tenud, Leander: *See*—
McGarrity, John; Tenud, Leander; and Meul, Thomas, 4,873,339, Cl. 548-110.000.

Terada, Hiromu; Fukahori, Naoyuki; and Sakunaga, Kenichi, to Mitsubishi Rayon Company, Ltd. Endoscope. 4,872,740, Cl. 350-96.260.

Terada, Kosei: *See*—
Oguri, Shigenori; and Terada, Kosei, 4,872,385, Cl. 84-635.000.

Terayama, Satoshi: *See*—
Sekine, Noboru; Aoki, Takashi; and Terayama, Satoshi, 4,872,540, Cl. 192-0.076.

Tews, Richard R., to Kimberly-Clark Corporation. Method of forming rapidly disintegrating paper tubes. 4,872,933, Cl. 156-184.000.

Texaco Inc.: *See*—
Bartels, Craig R.; Dorawala, Tansukhlal G.; Stephenson, Michael T.; Pasternak, Mordechai; and Reale, John, Jr., 4,872,991, Cl. 210-651.000.
Sanderson, John R.; and Larkin, John M., 4,873,380, Cl. 568-914.000.

Texas Instruments Incorporated: *See*—
Davis, Cecil J.; Abernathy, Joseph V.; Matthews, Robert T.; Hildenbrand, Randall C.; Simpson, Bruce; Jones, John I.; Loewenstein, Lee M.; and Bohlman, James G., 4,872,938, Cl. 156-345.000.
Jensen, Millard J.; and Levine, Jules D., 4,872,607, Cl. 228-180.100.
Roane, Bobby A., 4,873,565, Cl. 357-71.000.

Texidor, Teodoro A. Lined carton. 4,872,588, Cl. 220-403.000.

Texim International: *See*—
Guity-Mehr, Hossein F., 4,873,396, Cl. 174-66.000.

Thakur, Madhukar N.: *See*—
Kuchimanchi, Ravi; and Thakur, Madhukar N., 4,872,682, Cl. 273-153.00S.

Thamm, Horst-Dieter: *See*—
Erdmann, Fritz; Thamm, Horst-Dieter; and Staudt, Hans-Joachim, 4,873,169, Cl. 430-192.000.

Thenoz, Yves: *See*—
Cazaux, Yvon; Thenoz, Yves; Herault, Didier; and Blanchard, Pierre, 4,873,562, Cl. 357-24.000.

Theodoropulos, Spyros. Oxazine-ureas and thiazine urea chromophors. 4,873,318, Cl. 530-387.000.

Therm-O-Disc, Incorporated: *See*—
Ankenman, Bruce E.; and Cunitz, Donald G., 4,873,508, Cl. 338-25.000.
Antonas, Adamantios, 4,873,507, Cl. 338-22.00R.

Theros, Brian S., to Klein Tools Corporation. Working clamshell blister package for pliers or similar hand tools. 4,872,551, Cl. 206-349.000.

Thom, David; Swarthoff, Ton; and Maat, Jan, to Lever Brothers Company. Enzymatic detergent composition. 4,873,016, Cl. 252-174.120.

Thomas, Alvin D., to Crellin, Inc. Spring dye tube. 4,872,621, Cl. 242-118.110.

Thomas, Graham A.; and Borer, Timothy J., to British Broadcasting Corporation. Video signal processing for bandwidth reduction. 4,873,573, Cl. 358-133.000.

Thomas Industries Inc.: *See*—
Dean, Thomas E.; Henrich, William H.; Fischer, David M.; Stratton, Lawrence J.; and Pietsch, Herbert E., 4,873,471, Cl. 315-308.000.

Thomas J. Lipton, Inc.: *See*—
Butcher, Ian; and Hillman, Kevin P., 4,873,104, Cl. 426-249.000.

Thomas, William C.: *See*—
Peirish, Alfred J.; Schmidt, Theodore E.; and Thomas, William C., 4,872,286, Cl. 49-449.000.

Thomes Pharmacal Co., Inc.: *See*—
Blackman, Steven T., 4,873,265, Cl. 514-651.000.

Thompson, Frank B., to United Technologies Corporation. Static pressure system for gas turbine engines. 4,872,807, Cl. 415-118.000.

Thompson, Howard D. Apparatus for assisted parturition of livestock and method of making same. 4,872,457, Cl. 128-352.000.

Thompson, Marshall A. Corner painting attachment for paint rollers. 4,872,236, Cl. 15-118.000.

Thompson, Mortimer S., to Tri-Tech Systems International Inc. Closure cap with a seal and method of and apparatus for forming such closure and seal. 4,872,304, Cl. 53-487.000.

Thompson, Raymon F.; and Funk, Larry, to Semitool, Inc. Slow acting fluid valve. 4,872,638, Cl. 251-54.000.

Thompson, Steven L.; and Silverman, Melvin K. Liquid fiber wrap fingernail reinforcement composition. 4,873,077, Cl. 424-61.000.

Thomson-CSF: *See*—
Cazaux, Yvon; Thenoz, Yves; Herault, Didier; and Blanchard, Pierre, 4,873,562, Cl. 357-24.000.
de Chambost, Emmanuel; Micheron, Francois; Vallet, Francois; and Vignolle, Jean-Michel, 4,873,455, Cl. 307-201.000.
Girard, Bernard, 4,873,528, Cl. 343-770.000.

Thorn, Richard P., to Lord Corporation. Fluid filled resilient bushing. 4,872,651, Cl. 267-140.100.

Thorsett, Eugene D.: *See*—
Parsons, William H.; Patchett, Arthur A.; and Thorsett, Eugene D., 4,873,235, Cl. 514-312.000.

Thottathil, John K.: *See*—
Petrillo, Edward W., Jr.; Karanewsky, Donald S.; Thottathil, John K.; Heikes, James E.; and Grosso, John A., 4,873,356, Cl. 558-180.000.

Thouzeau, Andre : *See*—
Aime, Jean-Marc; Mention, Georges; and Thouzeau, Andre , 4,873,270, Cl. 523-128.000.

Thulin, Robert: *See*—
Banks, Lori; Busk, Grant C., Jr.; Chiang, Bin; and Thulin, Robert, 4,873,098, Cl. 426-94.000.

Thyes, Marco: *See*—
Rossy, Philip A.; Thyes, Marco; Franke, Albrecht; Koenig, Horst; Lehmann, Hans D.; Gries, Josef; Friedrich, Ludwig; and Lenke, Dieter, 4,873,246, Cl. 514-252.000.

Thyssen Stahl AG: *See*—
Auth, Rudolf; Seidelmann, Lothar; and Maas, Heinz, 4,872,906, Cl. 75-5.000.

Thyssen Stahl Aktiengesellschaft: *See*—
Strum, Josep; and Prange, Wilfried, 4,872,940, Cl. 156-379.800.

Tiffany, John, to Grendahl, Dennis T. Intraocular lens with ultraviolet screening agent. 4,872,877, Cl. 623-6.000.

Tiffany, John S., to Grendahl, Dennis T. Optical brigthener in an intraocular lens. 4,872,878, Cl. 623-6.000.

TMC Corporation: *See*—
Wittmann, Heinz; Erdei, Roland; and Szasz, Tibor, 4,872,272, Cl. 36-117.000.

Toa Nenryo Kogyo K.K.: *See*—
Komatsu, Masato; Baba, Isao; Mikami, Takashi; Narukawa, Kiyotada; and Kanai, Tsuyoshi, 4,873,288, Cl. 525-194.000.
Matsumura, Mitsuo; and Yoshida, Toshihiko, 4,873,115, Cl. 427-34.000.

Toa Nenryo Kogyo Kabushiki Kaisha: *See*—
Kono, Koichi; Okamoto, Kenkichi; Iwasaki, Rumi; and Sawada, Shuichi, 4,873,034, Cl. 264-41.000.

Tobita, Toshimitsu; Inaba, Hiromi; Yamazaki, Masachika; Suzuki, Masato; Morita, Yuzo; Kajiyama, Toshiki; Nakamura, Kiyoshi; and Yoneda, Kenji, to Hitachi, Ltd. Signal transmission method and system in elevator equipment. 4,872,532, Cl. 187-121.000.

Toda Kogyo Corp.: *See*—
Takedoi, Atsushi; Kondo, Hiroyuki; Isoai, Masaru; Yoshinaga, Yoshitaka; Harada, Tosiharu; Okuda, Yosiro; Sumita, Hiroshi; Kawasaki, Hirofumi; and Mori, Kohji, 4,873,010, Cl. 252-62.590.

Toda, Tsuyoshi: *See*—
Nakamura, Shigeru; Machida, Sadatsugi; and Toda, Tsuyoshi, 4,873,678, Cl. 369-13.000.

Todd, Charles W.: *See*—
Crawford, Frances G.; Shively, John E.; Todd, Charles W.; and Yang, Y. H. Joy, 4,873,313, Cl. 530-387.000.

Tognoni, Keith I.; Fitzgerald, John; Welch, Glenn; and Yonkers, Paul, to Digital Equipment Corporation. Video circuit enclosure for attachment to a cathode ray tube. 4,873,578, Cl. 358-254.000.

Togo, Sigeru; Saito, Yoichi; Tateyama, Masayuki; Okuma, Genji; and Miyazaki, Hiroya, to Nissan Motor Co., Ltd. Electrically powered power steering system for industrial vehicle or the like. 4,873,475, Cl. 318-489.000.

Tokura, Seiichi: *See*—
Azuma, Ichiro; Tokura, Seiichi; Nishimura, Shinichiro; and Seo, Hiroshi, 4,873,092, Cl. 424-499.000.

Tokyo Electric Power Co.: *See*—
Okabe, Yoshimi; Iwamoto, Keiichi; Torichigai, Masaaki; Kaneko, Shozo; Ichinari, Joji; and Koizumi, Kiyoshi, 4,872,347, Cl. 73-634.000.

Tokyo Electron Limited: *See*—
Imahashi, Issei, 4,873,447, Cl. 250-492.200.

Tokyo Kogaku Kikai Kabushiki Kaisha: *See*—
Nishio, Kouji; and Hanamura, Yoshihiko, 4,872,460, Cl. 128-648.000.

Tokyo Ohka Kogyo Co., Ltd.: *See*—
Tanaka, Hatsuyuki; Sato, Yoshiyuki; Kohara, Hidekatsu; and Nakayama, Toshimasa, 4,873,177, Cl. 430-326.000.

Tomaschke, John E., to Hydranautics Corporation. Interfacially synthesized reverse osmosis membrane containing an amine salt and processes for preparing the same. 4,872,984, Cl. 210-500.380.

Tomba, Giuseppe: *See*—
Silvano, Tomba; and Tomba, Giuseppe, 4,872,695, Cl. 280-257.000.

Tomczuk, Bruce E.; and Sutherland, Deborah S., to A. H. Robins Company, Incorporated. Method of treating animals using fused imidazoheterocyclic compounds. 4,873,251, Cl. 514-303.000.

Tominari, Noboru, to Dynavector, Inc. Multi-channel reproducing system. 4,873,722, Cl. 381-17.000.

Tomita, Katsuhiko: *See*—
Kotani, Haruo; and Tomita, Katsuhiko, 4,872,956, Cl. 204-1.00T.
Kotani, Haruo; and Tomita, Katsuhiko, 4,872,966, Cl. 204-414.000.

Tomoda, Takahisa: *See—*
Takeuchi, Mikio; Nakano, Kinichiro; Mitamura, Kenichi; and Tomoda, Takahisa, 4,873,530, Cl. 343-711.000.

Tomoyuki, Yoji: *See—*
Takeuchi, Akihiko; and Tomoyuki, Yoji, 4,873,428, Cl. 250-214.0DC.

Toms, Douglas: *See—*
Kolodesh, Michael S.; Toms, Douglas; and Pierson, Bruce A., 4,873,106, Cl. 426-481.000.

Tomskikh, Sergei F.: *See—*
Arbeniev, Alexandr S.; Ignatiev, Alexandr A.; Zhilin, Vitaly A.; Melnikov, Alexandr S.; and Tomskikh, Sergei F., 4,872,760, Cl. 366-7.000.

Tonegawa, Susumu: *See—*
Saito, Haruo; Kranz, David M.; Eisen, Herman N.; and Tonegawa, Susumu, 4,873,190, Cl. 435-172.300.

Tongu, Shinji, to Yazaki Corporation. Air-cooled absorption type cooling/heating water generating apparatus. 4,872,319, Cl. 62-141.000.

Topcik, Barry, to Union Carbide Chemicals and Plastics Company Inc. Process for extruding a thermoplastic copolymer. 4,873,042, Cl. 264-211.240.

Torichigai, Masaaki: *See—*
Okabe, Yoshimi; Iwamoto, Keiichi; Torichigai, Masaaki; Kaneko, Shozo; Ichinari, Joji; and Koizumi, Kiyoshi, 4,872,347, Cl. 73-634.000.

Torielli, Alessandro: *See—*
Licciardi, Luigi; and Torielli, Alessandro, 4,873,659, Cl. 364-784.000.

Torrington Company, The: *See—*
Dickinson, Thorn W., 4,872,770, Cl. 384-484.000.

Tosbac Computer System Co., Ltd.: *See—*
Tanaka, Yasunori; and Hashimoto, Hideo, 4,873,670, Cl. 365-189.110.

Toshiba Ceramics Co., Ltd.: *See—*
Matsushita, Junichi; Saito, Hajime; and Nagashima, Hideo, 4,873,053, Cl. 419-11.000.

Toshiba Silicone Co., Ltd.: *See—*
Shimizu, Chiyuki; and Yoshida, Tamio, 4,873,272, Cl. 523-212.000.

Toussaint, Francois; and Goelff, Pierre, to Glaverbel. Transparent fire-screening panels. 4,873,146, Cl. 428-428.000.

Townsend, Charles P. Energy absorbing ball. 4,872,676, Cl. 273-58.00H.

Townsend, Donald L.: *See—*
Streich, Herbert K.; Leach, Robert D.; Johnson, Joel R.; Olson, Thomas B.; and Townsend, Donald L., 4,873,422, Cl. 219-370.000.

Toyo Boseki Kabushiki Kaisha: *See—*
Kashima, Toshihiro; and Fukuda, Minoru, 4,873,131, Cl. 428-64.000.

Toyo Jozo Company, Ltd.: *See—*
Morishita, Masataka; Aikawa, Renji; Katsuragi, Shigeo; Yamamoto, Yoshiaki; and Sugimoto, Kenichi, 4,873,087, Cl. 424-433.000.

Toyoda Gosei Co., Ltd.: *See—*
Fujisawa, Norio; Sakamoto, Toshishige; Ito, Toshiyasu; and Shimada, Junichi, 4,872,745, Cl. 350-357.000.
Kaga, Koichi; Hosoi, Akio; and Yamaguchi, Takao, 4,872,364, Cl. 74-484.00H.
Nozaki, Masahiro, 4,872,288, Cl. 49-485.000.

Toyota Jidosha Kabushiki Kaisha: *See—*
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Ouchi, Mitsuyuki; and Aono, Koichi, 4,872,373, Cl. 74-711.000.
Sonoda, Hidefumi; Mori, Eiji; Kawase, Mitsuo; Yoneshige, Kazuhiro; Takahashi, Akira; Komiya, Hirokazu; and Tanaka, Akira, 4,872,439, Cl. 123-518.000.
Takagi, Kozi; Ido, Noriyuki; Ohno, Sadayuki; Suzuki, Hideaki; Inoue, Yoshiaki; and Nomura, Yoshihisa, 4,872,730, Cl. 303-92.000.

Toyotomi Kogyo Co., Ltd.: *See—*
Nakamura, Kazuharu; Mito, Yoshio; Nakanishi, Yutaka; Yamada, Toshihiko; Nakamura, Kenji; and Itoh, Kiyonobu, 4,872,829, Cl. 431-33.000.

Traber, Jorg: *See—*
Junge, Bodo; Richter, Bernd; Glaser, Thomas; Traber, Jorg; and Allen, George S., 4,873,262, Cl. 514-510.000.

Trabert, Ludwig: *See—*
Lindner, Christian; Wittmann, Dieter; Trabert, Ludwig; Suling, Carlhans; Bartl, Herbert; and Ott, Karl-Heinz, 4,873,289, Cl. 525-293.000.

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Trainor, Diane A., to ICI Americas Inc. Difluoro peptide compounds. 4,873,221, Cl. 514-18.000.

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Ames, Douglas A., 4,872,557, Cl. 206-504.000.

Trasko, Theodore W. Golf course and method of playing a golf game. 4,872,686, Cl. 273-176.0AB.

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Myers, Clyde J.; Stephenson, Daniel L.; and Travieso, Ruben, 4,872,736, Cl. 350-96.200.

Travis, Tonny D. Dusting apparatus. 4,872,598, Cl. 222-630.000.

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Zahn, Wolfgang; Fursich, Manfred; Nitsch, Wilhelm; Rauh, Hans-Jurgen; and Treiber, Helmut, 4,873,546, Cl. 355-38.000.

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Jakob, Wolfgang; Alewelt, Wolfgang; and Tresper, Erhard, 4,873,326, Cl. 540-538.000.

Tretter, Steven A., to Penril Corporation. Modem and method for 8 dimensional trellis code modulation. 4,873,701, Cl. 375-27.000.

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Thompson, Mortimer S., 4,872,304, Cl. 53-487.000.

Tri Tool Inc.: *See—*
VanderPol, Jerald; Silber, Cory J.; and Astle, William H., 4,872,249, Cl. 29-157.400.

Trio Kabushiki Kaisha: *See—*
Kobayashi, Hirokazu; Miyamoto, Yukihiko; Takai, Masaoki; Fujisawa, Syuichi; and Miyazawa, Hiroshi, 4,873,684, Cl. 370-102.000.

Triton Engineering Services Company: *See—*
Nelson, Jack R., 4,872,520, Cl. 175-329.000.

Trojan Technologies, Inc.: *See—*
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Troutner, Arthur L.; and O'Sullivan, Kevin B., to Trus Joist Corporation. Key clip support member. 4,872,299, Cl. 52-693.000.

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Engel, Wolfhard; Eberlein, Wolfgang; Mihm, Gerhard; Trummlitz, Gunter; Mayer, Norbert; and De Jonge, Adriaan, 4,873,236, Cl. 514-220.000.

Trus Joist Corporation: *See—*
Troutner, Arthur L.; and O'Sullivan, Kevin B., 4,872,299, Cl. 52-693.000.

TRW Inc.: *See—*
Koutsoukos, Elias P., 4,873,214, Cl. 502-185.000.
Rabe, William T.; and Gilbert, Wendell L., 4,872,393, Cl. 91-375.00A.

TRW Repa GmbH: *See—*
Biller, Dieter; and Biller, Joachim, 4,872,704, Cl. 280-808.000.

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Drits, Vladimir; and Tselesin, Naum, 4,873,605, Cl. 361-143.000.

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Nagai, Noboru; Hashimoto, Yoshisato; Tsuboike, Yoshihiko; and Kaito, Noboru, 4,872,308, Cl. 60-316.000.

Tsuchiya, Osamu: *See—*
Shimizu, Shinji; Tsuchiya, Osamu; and Sato, Katsuyuki, 4,873,559, Cl. 357-23.600.

Tsuchiya, Tsutomu: *See—*
Umezawa, Sumio; Tsuchiya, Tsutomu; Takeuchi, Tomio; Umezawa, Kazuo; Takahashi, Yoshiaki; Shitara, Tetsuo; Kobayashi, Yoshihiko; and Takagi, Yasushi, 4,873,225, Cl. 514-41.000.

Tsuji, Sadafusa: *See—*
Tanaka, Yoshihiro; Tsuji, Sadafusa; Hata, Yoshiaki; Inoue, Manabu; Ootsuka, Hiroshi; Iwata, Michihiro; Ishito, Fumiaki; and Hayama, Koh, 4,873,544, Cl. 354-457.000.

Tsuji, Shinji: *See—*
Uomi, Kazuhisa; Tsuji, Shinji; Sakano, Shinji; Okai, Makoto; and Chinone, Naoki, 4,873,691, Cl. 372-20.000.

Tsukada, Tetsuro: *See—*
Suzuki, Koji; Tsukada, Tetsuro; Saito, Yoshihiko; Arai, Kiyotaka; and Mori, Hiroshi, 4,872,958, Cl. 204-98.000.

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Tsumura, Kazunobu: *See—*
Sawamura, Norio; Matsuo, Takaharu; Tsumura, Kazunobu; and Ebihara, Yoshitaka, 4,873,194, Cl. 435-198.000.

Tsuruoka, Michihiko; Nakagawa, Wataru; Miyoshi, Noriomi; Konosu, Naohiro; and Hashimoto, Tadao, to Fuji Electric Co., Ltd. Vibrating type transducer. 4,872,335, Cl. 73-30.000.

Tucker, Howard: *See—*
Hughes, Leslie R.; Oldfield, John; and Tucker, Howard, 4,873,329, Cl. 544-265.000.

Tullis, Barclay J.; and Baer, Richard G., to Hewlett-Packard Company. Hot chuck assembly for integrated circuit wafers. 4,872,835, Cl. 432-225.000.

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Blanton, Keith A.; Finlay, William M.; Sinclair, Michael J.; and Tumblin, John E., 4,873,585, Cl. 358-335.000.

Tung, Lu H.: *See—*
Chau, C. C.; Im, Jang-hi; Raspor, Otto C.; and Tung, Lu H., 4,873,037, Cl. 264-49.000.

Turco, Pietro: *See—*
Federici, Franco; Pallozzi, Franco; Cozzi, Ennio; and Turco, Pietro, 4,873,307, Cl. 528-60.000.

Turner, Ian: *See—*
Chung, Chi H.; Rees, Theodore D.; and Turner, Ian, 4,873,680, Cl. 369-59.000.

U-Line Corporation: *See—*
Reed, William A., 4,872,317, Cl. 62-135.000.

UBE Industries, Ltd.: *See—*
Joh, Yasushi, 4,872,867, Cl. 604-269.000.

Uchida, Kuniaki: *See—*
Fujimoto, Masayuki; Tao, Muneo; and Uchida, Kuniaki, 4,872,831, Cl. 431-73.000.

Uchida, Kuninobu: *See—*
Minagawa, Takehiro; Stou, Toshio; Miyata, Masao; Nemoto, Kenji; and Uchida, Kuninobu, 4,872,793, Cl. 409-244.000.

Uchida, Masaaki: *See—*
Nagaishi, Hatsuo; Seimiya, Yasuo; Tamura, Hideyuki; Miwa, Hiromichi; Sanbuichi, Hiroshi; Uchida, Masaaki; and Takahata, Toshio, 4,873,641, Cl. 364-431.040.

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Uchida, Shinichi: *See—*
Kawajiri, Tatsuya; Onodera, Hideo; Uchida, Shinichi; Aoki, Yukio; and Wada, Masahiro, 4,873,217, Cl. 502-311.000.

Uchida, Takashi: *See—*
Hirose, Yoshihiko; Aoki, Tomohiro; Chiku, Kazuyoshi; Murayama, Yasushi; Uchida, Takashi; Matsuzawa, Kunihiko; and Kanekura, Kazunori, 4,873,541, Cl. 346-160.100.

Uchiyama, Naoki: *See—*
Kanehira, Katsuyaki; Takayama, Syuichi; Amano, Atsushi; Hibino, Hiroki; Uchiyama, Naoki; and Nakada, Akio, 4,872,458, Cl. 128-401.000.

Uclaf, Roussel: *See—*
Coussediere, Daniel; Gigliotti, Giuseppe; and Moguilewsky, Martine, 4,873,256, Cl. 514-391.000.

Ueda, Fusao: *See—*
Kimura, Kiyoshi; Ueda, Fusao; and Ogasawara, Takashi, 4,873,242, Cl. 514-242.000.

Ueda, Hiroyuki, to Canon Kabushiki Kaisha. Printing wheel discriminating apparatus. 4,872,773, Cl. 400-144.200.

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Adachi, Ikuo; Yamamori, Teruo; Ueda, Motohiko; and Sato, Hatsuo, 4,873,334, Cl. 514-303.000.

Ueki, Masao: *See—*
Matsuyama, Jinsho; Hirai, Yutaka; Ueki, Masao; and Sakai, Akira, 4,873,125, Cl. 427-248.100.

Ueno, Hiroshi; Satomi, Tomoaki; and Yoshida, Teruo, to Koyo Seiko Co., Ltd. Bearing. 4,872,771, Cl. 384-492.000.

Uesugi, Akio; Kakei, Tsutomu; and Minato, Shinichiro, to Fuji Photo Film Co., Ltd. Method of manufacturing supports for lithographic printing plate. 4,872,946, Cl. 156-637.000.

Uesugi, Fumihiko; and Morishige, Yukio, to NEC Corporation. Method and apparatus for writing a line on a patterned substrate. 4,873,413, Cl. 219-121.680.

Ueyama, Yoshiji; and Asayama, Yoshiaki, to Mitsubishi Denki Kabushiki Kaisha. Throttle valve controlling apparatus including relative position limiting means for throttle valves. 4,872,435, Cl. 123-336.000.

Umakoshi, Yukimori: *See—*
Sato, Hiroshi; Ohashi, Toshijiro; Hamada, Toyohide; Umakoshi, Yukimori; Suzuki, Takamichi; Wada, Yuuji; Hara, Shigeo; and Fukumoto, Youshuke, 4,872,618, Cl. 242-4.00R.

Umemoto, Mitsumasa; Asano, Tamotsu; Horie, Hironobu; Takagi, Akinobu; Tamura, Nobuyasu; and Nishida, Takeshi, to Mitsui Toatsu Chemicals, Inc. Process for preparation of 3-phenoxybenzyl 2-(4-alkoxyphenyl)-2-methylpropyl ethers. 4,873,373, Cl. 568-637.000.

Umemoto, Teruo; and Gotoh, Yoshihiko, to Sagami Chemical Research Center. Fluoroalkylaryliodonuim compounds. 4,873,027, Cl. 562-83.000.

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Nakamura, Hironori; Yotsui, Toshiaki; Sato, Youichi; Umetsubo, Toshiaki; and Ohkawa, Hideo, 4,872,247, Cl. 29-125.000.

Umezawa, Kazuo: *See—*
Umezawa, Sumio; Tsuchiya, Tsutomu; Takeuchi, Tomio; Umezawa, Kazuo; Takahashi, Yoshiaki; Shitara, Tetsuo; Kobayashi, Yoshihiko; and Takagi, Yasushi, 4,873,225, Cl. 514-41.000.

Umezawa, Sumio; Tsuchiya, Tsutomu; Takeuchi, Tomio; Umezawa, Kazuo; Takahashi, Yoshiaki; Shitara, Tetsuo; Kobayashi, Yoshihiko; and Takagi, Yasushi, to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai. 1-n-(4-amino-3-fluoro-2-hydroxybutyryl)-kanamycins. 4,873,225, Cl. 514-41.000.

Umotoy, Salvador P.: *See—*
Wang, David N.; White, John M.; Law, Kam S.; Leung, Cissy; Umotoy, Salvador P.; Collins, Kenneth S.; Adamik, John A.; Perlov, Ilya; and Maydan, Dan, 4,872,947, Cl. 156-643.000.

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Uni-Frac Inc.: *See—*
Parker, Trent J.; and Parker, Byron M., 4,872,955, Cl. 202-154.000.

Unicorn Electrical Products: *See—*
Vogele, Thomas A., 4,873,600, Cl. 361-426.000.

Unilever Patent Holdings B.V.: *See—*
De Rooij, Johannes F. M.; and Meakins, Stephen E., 4,873,108, Cl. 426-533.000.

Union Camp Corporation: *See—*
Bornack, Walter K., Jr.; and McNally, Keith R., 4,873,311, Cl. 528-272.000.

Union Carbide Chemicals and Plastics Company Inc.: *See—*
Ancker, Fred H., 4,873,116, Cl. 428-36.900.
Brode, George L., II; and Merritt, Frederick M., II, 4,873,293, Cl. 525-417.000.
Topcik, Barry, 4,873,042, Cl. 264-211.240.

Union Carbide Corporation: *See—*
Howard, Ronald A., 4,872,914, Cl. 106-285.000.
King, Stephen W., 4,873,017, Cl. 252-183.110.

Unisys Corporation: *See—*
Rusterholz, John T.; Lahti, Archie E.; Bushard, Louis B.; Byers, Larry L.; Hamstra, James R.; and Homan, Charles J., 4,873,630, Cl. 364-200.000.

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Borodin, Daniel J., 4,872,923, Cl. 148-11.50R.

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Administrator, National Aeronautics and Space Administration: *See—*
Kleinberg, Leonard L., 4,873,498, Cl. 331-116.0FE.
Air Force: *See—*
Barasch, Marian; and Mirella, Charles H., 4,872,354, Cl. 73-865.800.
Eylon, Daniel; Froes, Francis H.; and Yolton, Charles F., 4,872,927, Cl. 148-20.300.
Hutta, Joseph J., 4,872,894, Cl. 65-3.110.
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Jochim, Michael M.; and Jones, Suzanne C., 4,873,189, Cl. 435-68.000.
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Algor, Marshall M., 4,873,499, Cl. 331-117.00R.
Branovich, Louis E.; Smith, Bernard; Freeman, Gerard L.; and Eckart, Donald W., 4,872,864, Cl. 445-50.000.
Kornfeld, Gertrude H., 4,873,657, Cl. 364-578.000.
Schodowski, Stanley S., 4,872,765, Cl. 374-117.000.
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Bourne, Roy S.; Eichman, Clarence C.; and Welbon, William W., 4,872,905, Cl. 75-0.50C.
Cooke, D. Wayne; and Jahan, Muhammad S., 4,873,444, Cl. 250-337.000.
Gray, Kenneth E., 4,873,482, Cl. 324-71.400.
Pekala, Richard W., 4,873,218, Cl. 502-418.000.
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Gould, John H., 4,873,197, Cl. 436-77.000.
Health and Human Services: *See—*
Kunkel, Thomas A., 4,873,192, Cl. 435-172.300.
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Hislop, Alfred R., 4,873,501, Cl. 333-204.000.
Jaenichen, Paul N., Sr., 4,872,309, Cl. 60-497.000.

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Braat, Josephus J. M., 4,872,748, Cl. 350-432.000.
Buis, Edwin J., 4,872,358, Cl. 74-99.00R.
De Haan, Gerard, 4,873,575, Cl. 358-166.000.
Doyen, Daniel; and Vriz, Tarcisio, 4,873,495, Cl. 331-68.000.
Freeman, Kenneth G., 4,873,472, Cl. 315-366.000.
Gibson, Peter J., 4,873,529, Cl. 343-700.0MS.
Kemper, Nicolaas R.; Bouwens, Henricus J. J.; Koster, Marinus P.; and De Peuter, Willem L. G., 4,872,362, Cl. 74-479.000.
Kuhn, Michael H.; Helzel, Thomas; Proksa, Roland; and Van Den Berg, Noel J. M., 4,873,486, Cl. 324-307.000.
Pellerin, Daniel, 4,873,689, Cl. 371-37.100.
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Visser, Jacob S., 4,873,502, Cl. 333-216.000.

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United Technologies Corporation: *See—*
Brown, Wesley D.; Hill, Edward C.; and Vercellone, Peter T., 4,872,810, Cl. 416-145.000.
Thompson, Frank B., 4,872,807, Cl. 415-118.000.

Universal Instruments Corporation: *See—*
Ragard, Phillip A., 4,872,258, Cl. 29-740.000.

Universite Du Maine (Le Mans): *See—*
Robin, Jean-Pierre; and Landais, Yannick, 4,873,349, Cl. 549-298.000.

University of California, The Regents of the: *See—*
Coldren, Larry A.; Scott, Jeffery W.; and Yan, Ran H., 4,873,696, Cl. 372-96.000.

University of Melbourne, The: *See—*
Schmalzi, Karl J.; Sharma, Suresh C.; and Christopherson, Richard I., 4,873,228, Cl. 514-49.000.

University of Michigan, The: *See—*
Counsell, Raymond E.; Longino, Marc A.; Weichert, Jamey P.; and Schwendner, Susan P., 4,873,075, Cl. 424-1.100.

University of Mississippi, The: *See—*
Hufford, Charles D.; and Clark, Alice M., 4,873,250, Cl. 514-290.000.

University of Missouri, The Curators of the: *See*—
Logan, K. William; and McFarland, William D., 4,873,632, Cl. 364-413.130.
University of Pennsylvania: *See*—
Abe, Yoshihiro; and Nocolaou, Kyriacos C., 4,873,024, Cl. 260-405.500.
University of Pittsburgh of the Commonwealth System of Higher Education: *See*—
Coon, Darryl D.; Karunasiri, Runkiri P.; and Liu, Hui C., 4,873,555, Cl. 357-4.000.
University of Rochester, The: *See*—
Williamson, Steven L., 4,873,485, Cl. 324-96.000.
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Schmalzi, Karl J.; Sharma, Suresh C.; and Christopherson, Richard I., 4,873,228, Cl. 514-49.000.
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Lewis, Jeffrey M. O.; and Price, Joe B., 4,873,390, Cl. 585-638.000.
Olson, Kurt D., 4,873,325, Cl. 540-536.000.
Sachtler, J. W. Adriaan; and Lawson, R. Joe, 4,873,387, Cl. 585-482.000.
Sechrist, Paul A., 4,872,969, Cl. 208-173.000.
Uotani, Kunihiro: *See*—
Kato, Toshio; Uotani, Kunihiro; and Ito, Mitsuhiko, 4,872,659, Cl. 271-9.000.
Upjohn Company, The: *See*—
Anderson, David J., 4,873,346, Cl. 548-157.000.
Sih, John C.; and Cho, Moo J., 4,873,337, Cl. 546-271.000.
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Urbach, Edward A.: *See*—
Hanson, Richard A.; Peters, Rex B.; Norling, Brian L.; and Urbach, Edward A., 4,872,342, Cl. 73-517.00R.
Ushijima, Fumihiro: *See*—
Asada, Toshiyuki; Ushijima, Fumihiro; and Higashiyama, Yasuhiko, 4,872,376, Cl. 74-765.000.
Ushijima, Takao: *See*—
Tabata, Toshiyuki; Ishiyama, Tatsuro; Ushijima, Takao; and Dan, Takuya, 4,872,650, Cl. 267-140.100.
Usui, Makoto: *See*—
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Usui, Nobuhiro: *See*—
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Miller, Gene W., 4,872,899, Cl. 71-11.000.
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See, Chung W.; and Vaez-Iravani, Mehdi, 4,873,434, Cl. 250-235.000.
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Gay, Christian; and Lassiaz, Philippe, 4,872,539, Cl. 192-98.000.
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Vamvakaris, Christos: *See*—
Nowakowsky, Bernhard H.; Beck, Juergen; Hartmann, Heinrich; and Vamvakaris, Christos, 4,873,299, Cl. 526-73.000.
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Van Der Avoort, Henricus J. M., to U.S. Philips Corporation. Method of fixing a cathode-ray tube cone and display window prior to sealing and a cathode-ray tube manfactured by such a method. 4,872,863, Cl. 445-45.000.
van der Meer, Roelof: *See*—
Fujii, Susumi; Ishida, Hiromi; Morioka, Masataka; Saito, Akihiro; and van der Meer, Roelof, 4,873,276, Cl. 524-153.000.
Gallucci, Robert R.; van der Meer, Roelof; and Avakian, Roger W., 4,873,286, Cl. 525-92.000.
Van Der Meulen, Peter, to U.S. Philips Corp. Method and arrangement for suppressing coherent interferences in magnetic resonance signals. 4,873,487, Cl. 324-314.000.
VanderPol, Jerald; Silber, Cory J.; and Astle, William H., to Tri Tool Inc. Tool support and guide system for repair of boiler tube panels and process for carrying out repair using same. 4,872,249, Cl. 29-157.400.
van der Schoot, Jelle, to Staalkat B.V. Method of, and apparatus for, automatically checking eggs for flaws and blemishes, such as cracks, blood, dirt, a leak, aberrant form and the like. 4,872,564, Cl. 209-511.000.
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Hasker, Jan; Van Esdonk, Johannes; and Kwestroo, Wim, 4,873,052, Cl. 419-2.000.
Van Horn, Samuel L. Method and apparatus for improved electroplating and painting racks. 4,872,963, Cl. 204-297.00W.
Vaniglia, Mario M., to Cincinnati Milacron Inc. Serco driven redirect roller apparatus for fiber placement machine. 4,872,619, Cl. 242-7.210.
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VanRens, Russell J., to Outboard Marine Corporation. Die member for forming a lost foam pattern. 4,872,637, Cl. 249-59.000.
Van Wijk, Hendrik F., to Nederlandse Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek TNO. Membrane module for hyperfiltration or ultrafiltration of containating liquid flows. 4,872,990, Cl. 210-644.000.
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Quirk, Jennifer M.; and Carter, Charles G., 4,873,358, Cl. 560-22.000.

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Weinhold, Karl. Device for connecting a hose end to a connecting spigot. 4,872,711, Cl. 285-88.000.

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Willard, David F.: *See*—
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Wingo, James C., Jr., to Riddell, Inc. Cantilever strap for football shoulder pads. 4,872,216, Cl. 2-2.000.

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Wolf, Eugene M.: *See*—
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Wolf, Jeffrey, to Teleflex Incorporated. Remote actuator for trip valve. 4,872,365, Cl. 74-501.600.

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Wong, Martin, to Abbott Laboratories. Preparation of sized populations of liposomes. 4,873,035, Cl. 264-4.600.

Wong, Siu-Weng S.; Chen, Devereaux C.; and Chiu, Kuang-Yi, to Hewlett-Packard Company. Method for making silicide interconnection structures for integrated circuit devices. 4,873,204, Cl. 437-200.000.

Wonnacott, Gary C. Water sprinkler head cleaning tool. 4,872,234, Cl. 15-104.160.

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Wrench, Robert A. Holder for knife sharpener or the like. 4,872,378, Cl. 76-86.000.

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Wyberg, Gregory R., to Minnesota Mining and Manufacturing Company. Gable-top container. 4,872,562, Cl. 206-631.300.

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Yagi, Hiroshi: *See*—
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Yamada, Toshihiko: *See*—
Nakamura, Kazuharu; Mito, Yoshio; Nakanishi, Yutaka; Yamada, Toshihiko; Nakamura, Kenji; and Itoh, Kiyonobu, 4,872,829, Cl. 431-33.000.

Yamada, Toshihiro: *See*—
Satoh, Motohiro; Yamada, Toshihiro; Kohono, Akiomi; Yamamoto, Akihiko; Taguchi, Keiji; Daikoku, Takahiro; and Kobayashi, Fumiuki, 4,872,606, Cl. 228-121.000.

Yamada, Tsuyoshi: *See*—
Tada, Tetsuo; and Yamada, Tsuyoshi, 4,873,686, Cl. 371-22.400.

Yamada, Yasuhiro; Imamura, Takeshi; Honda, Hidemasa; Fujii, Masaki; and Minohata, Masanori, to Koa Oil Company, Limited Director General, Agency of Industrial Science Technology. Graphite structures and method for production thereof. 4,873,071, Cl. 423-448.000.

Yamada, Yoshiro: *See*—
Miyazaki, Takao; Yamada, Yoshiro; and Komine, Isamu, 4,872,758, Cl. 356-381.000.

Yamada, Yutaka; Kozawa, Tadashi; Natsume, Naohiro; and Komatsubara, Hirofumi, to Aisan Kogyo Kabushiki Kaisha; and Yamada, Yutaka. Centrifugal pump of vortex-flow type. 4,872,806, Cl. 415-55.500.

Yamaguchi, Shigeru: *See*—
Higuchi, Noboru; Matsui, Keizo; Kobayashi, Chuzo; and Yamaguchi, Shigeru, 4,872,763, Cl. 366-160.000.

Yamaguchi, Susumu: *See*—
Kawasaki, Yoshiki; Hioki, Yoshihiro; Ohno, Yuichi; Ichida, Kozaburo; Yamaguchi, Susumu; Sudo, Michitaka; and Chikazawa, Bunichiro, 4,872,245, Cl. 29-81.00A.

Yamaguchi, Takao: *See*—
Kaga, Koichi; Hosoi, Akio; and Yamaguchi, Takao, 4,872,364, Cl. 74-484.00H.

Yamaha Corporation: *See*—
Oguri, Shigenori; and Terada, Kosei, 4,872,385, Cl. 84-635.000.

Yamaha Hatsudoki Kabushiki Kaisha: *See*—
Horiuchi, Kotaro; and Suzuki, Masato, 4,872,805, Cl. 415-7.000.

Yamakawa Yakuhin Kogyo Kabushiki Kaisha: *See*—
Nohira, Hiroyuki; Kamei, Masanao; Nakamura, Shinichi; Yoshinaga, Kazuo; Kai, Mariko; and Katagiri, Kazuharu, 4,873,018, Cl. 252-299.010.

Yamamori, Teruo: *See*—
Adachi, Ikuo; Yamamori, Teruo; Ueda, Motohiko; and Sato, Hatsuo, 4,873,334, Cl. 514-303.000.

Yamamoto, Akihiko: *See*—
Satoh, Motohiro; Yamada, Toshihiro; Kohono, Akiomi; Yamamoto, Akihiko; Taguchi, Keiji; Daikoku, Takahiro; and Kobayashi, Fumiuki, 4,872,606, Cl. 228-121.000.

Yamamoto, Hirokazu: *See*—
Senga, Takao; Takaoka, Kazuchiyo; Yamamoto, Hirokazu; and Hashimoto, Takimi, 4,873,166, Cl. 430-137.000.

Yamamoto, Kyohei, to Mitsubishi Denki Kabushiki Kaisha. Method of and apparatus for controlling the opertion of electromagnetic switches. 4,873,607, Cl. 361-210.000.

Yamamoto, Masafumi: *See*—
Ono, Shuji; and Yamamoto, Masafumi, 4,873,435, Cl. 250-235.000.

Yamamoto, Masakazu: *See*—
Kaji, Kichiro; Shimasaki, Katsunori; Yamamoto, Masakazu; Saiki, Kozo; Yura, Keita; Habata, Hidetsugu; Kimura, Isao; and Suzuki, Tetsuo, 4,873,070, Cl. 423-345.000.

Yamamoto, Osamu: *See*—
Hirota, Toshio; Ohuchi, Takashi; and Yamamoto, Osamu, 4,873,155, Cl. 429-26.000.

Yamamoto, Toshifumi: *See*—
Minowa, Takehiko; and Yamamoto, Toshifumi, 4,873,536, Cl. 346-76.0PH.

Yamamoto, Yasuyoshi: *See*—
Sasaki, Nobukazu; Kasamura, Toshirou; Ohashi, Masashi; Okuda, Naoki; Kusumoto, Toshihiko; Maeda, Yasunori; Ozawa, Takashi; Yamamoto, Yasuyoshi; Kubota, Atsushi; Kimura, Akiyoshi; and Masuda, Makoto, 4,873,547, Cl. 355-316.000.

Yamamoto, Yoshiaki: *See*—
Morishita, Masataka; Aikawa, Renji; Katsuragi, Shigeo; Yamamoto, Yoshiaki; and Sugimoto, Kenichi, 4,873,087, Cl. 424-433.000.

Yamana, Keiichi; Imai, Masaru; and Ohtsuka, Shuichi, to Fuji Photo Film Co., Ltd. Method of developing image on electrophotographic film. 4,873,545, Cl. 355-256.000.

Yamanishi, kazuhiro: *See*—
Kobayashi, Masaaki; Yamanishi, kazuhiro; Takeuchi, Akihiro; and Nagaoka, Yoshitomi, 4,873,583, Cl. 358-310.000.

Yamanouchi, Kiyoshi; and Iwase, Sumio, to Sony Corporation. Automatic telephone answering apparatus and method. 4,873,713, Cl. 379-67.000.

Yamao, Masanobu: *See*—
Wakabayashi, Minoru; Murata, Hiroyuki; Sugino, Yasuo; Yamao, Masanobu; and Nishikawa, Takao, 4,872,972, Cl. 209-143.000.

Yamashita, Norihisa: *See*—
Katoh, Tsuguhiro; Maeda, Kiyoto; Shiroshita, Masao; Yamashita, Norihisa; Sanemitsu, Yuzuru; and Inoue, Satoru, 4,873,248, Cl. 514-269.000.

Yamazaki, Masachika: *See*—
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Yan, Ran H.: *See*—
Coldren, Larry A.; Scott, Jeffery W.; and Yan, Ran H., 4,873,696, Cl. 372-96.000.

Yanagiuchi, Shigenobu: *See*—
Omori, Takuro; and Yanagiuchi, Shigenobu, 4,873,628, Cl. 364-200.000.

Yanahira, Shuichi: *See*—
Deya, Eiki; Yanahira, Shuichi; Abiko, Kenkichi; and Kikuchi, Eiichi, 4,873,229, Cl. 514-54.000.

Yanai, Akio: *See*—
Yasunaga, Tadashi; and Yanai, Akio, 4,873,154, Cl. 428-694.000.

Yang, Y. H. Joy: *See*—
Crawford, Frances G.; Shively, John E.; Todd, Charles W.; and Yang, Y. H. Joy, 4,873,313, Cl. 530-387.000.

Yano, Akechi. Roll with an arched shaft. 4,872,246, Cl. 29-116.100.

Yanushefski, Katherine A.: *See*—
Hokanson, John L.; Smeltz, Palmer D., Jr.; Yanushefski, Katherine A.; Yanushefski, Michael J.; and Young, Craig A., 4,873,566, Cl. 357-74.000.

Yanushefski, Michael J.: *See*—
Hokanson, John L.; Smeltz, Palmer D., Jr.; Yanushefski, Katherine A.; Yanushefski, Michael J.; and Young, Craig A., 4,873,566, Cl. 357-74.000.

Yasuda, Satoshi: *See*—
Uchida, Mitsuru; Yasuda, Satoshi; and Kuribayashi, Tetsuya, 4,873,185, Cl. 430-903.000.

Yasukawa, Shigeko, sole heiress: *See*—
Yasukawa, Wataru, deceased; Kiyoshige, Masanori; Horikawa, Takeshi; Okada, Tomonobu; Ochi, Tadafumi; Aoki, Yoshiaki; Higashida, Masahiko; Kawashima, Takashi; Koe, Shigeki; Ono, Hideo; Nihei, Kanta; Takasugi, Syunji; and Take, Koji, 4,872,293, Cl. 51-410.000.

Yasukawa, Wataru, deceased (by Yasukawa, Shigeko, sole heiress); Kiyoshige, Masanori; Horikawa, Takeshi; Okada, Tomonobu; Ochi, Tadafumi; Aoki, Yoshiaki; Higashida, Masahiko; Kawashima, Takashi; Koe, Shigeki; Ono, Hideo; Nihei, Kanta; Takasugi, Syunji; and Take, Koji, to Kawasaki Jukogyo Kabushiki Kaisha. Abrasive water jet cutting apparatus. 4,872,293, Cl. 51-410.000.

Yasunaga, Tadashi; and Yanai, Akio, to Fuji Photo Film Co., Ltd. Magnetic recording medium containing Fe, Co, N and O. 4,873,154, Cl. 428-694.000.

Yato, Tadao; Hagino, Sadaaki; and Tanaka, Hiroshi, to Mitsubishi Kinzoku Kabushiki Kaisha. Method of controlling the crystal grain size of uranium dioxide pellet. 4,873,031, Cl. 264-0.500.

Yatomi, Toshiya: *See*—
Kimura, Takashi; Yatomi, Toshiya; and Edakubo, Hiroo, 4,873,591, Cl. 360-85.000.

Yazaki Corporation: *See*—
Tongu, Shinji, 4,872,319, Cl. 62-141.000.

Yeager, Gary W.; and Schissel, David N., to General Electric Company. Hydroxy-terminated arylene ethers, and method for making. 4,873,371, Cl. 568-33.000.

Yeaman, George A.: *See*—
Katchka, Jay R.; Yeaman, George A.; and McKinney, Richard W., 4,872,830, Cl. 431-54.000.

Yeazel, Kenneth L.; and Forester, Robert J., to Crane Carrier Company. Side refuse loader for vehicles. 4,872,801, Cl. 414-409.000.

Yinger, William W. Plant support. 4,872,283, Cl. 47-70.000.

Yokohama Rubber Co., Ltd., The: *See*—
Hanada, Ryoji; Morikawa, Tuneo; and Kabe, Kazuyuki, 4,872,497, Cl. 152-541.000.

Yolton, Charles F.: *See*—
Eylon, Daniel; Froes, Francis H.; and Yolton, Charles F., 4,872,927, Cl. 148-20.300.

Yoneda, Kenji: *See*—
Tobita, Toshimitsu; Inaba, Hiromi; Yamazaki, Masachika; Suzuki, Masato; Morita, Yuzo; Kajiyama, Toshiki; Nakamura, Kiyoshi; and Yoneda, Kenji, 4,872,532, Cl. 187-121.000.

Yoneshige, Kazuhiro: *See*—
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Yonkers, Paul: *See*—
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Yorio, Ralph: *See*—
Critton, Thomas J.; Johnson, Donald S.; Pukalo, Walter P.; and Yorio, Ralph, 4,872,369, Cl. 74-574.000.

Yoshida, Katsuhira; and Kubo, Yuji, to Mitsubishi Chemical Industries Limited. Metal-containing indoaniline compound and optical recording medium employing the compound. 4,873,332, Cl. 546-7.000.

Yoshida, Takuji, to Oki Electric Industry Co., Ltd. Voltage level detecting circuit having a level converter. 4,873,458, Cl. 307-362.000.

Yoshida, Tamio: *See*—
Shimizu, Chiyuki; and Yoshida, Tamio, 4,873,272, Cl. 523-212.000.

Yoshida, Teruo: *See*—
Ueno, Hiroshi; Satomi, Tomoaki; and Yoshida, Teruo, 4,872,771, Cl. 384-492.000.

Yoshida, Tetsuo: *See*—
Sasaoka, Senzo; Yoshida, Tetsuo; and Inoue, Nobuaki, 4,873,173, Cl. 430-964.000.

Yoshida, Toshihiko: *See*—
Matsumura, Mitsuo; and Yoshida, Toshihiko, 4,873,115, Cl. 427-34.000.

Yoshii, Akio: *See*—
Archer, Gary D.; Huff, Eugene G.; Madrid, Miguel T., Jr.; and Yoshii, Akio, 4,873,625, Cl. 364-200.000.

Yoshiji, Takeo: *See*—
Kuwabara, Takasi; Yoshiji, Takeo; and Tegawa, Masao, 4,872,417, Cl. 118-411.000.
Yoshikawa, Masao; and Nakahata, Kimio, to Canon Kabushiki Kaisha. Magnet roll developing apparatus. 4,872,418, Cl. 118-657.000.
Yoshikawa, Masato; Fukuura, Yukio; Akiyama, Setsuo; Nakamura, Makoto; Naito, Kazuo; and Honda, Toshio, to Bridgestone Corporation. Method for making rubbery composite materials by plating a metal substrate with a cobalt alloy. 4,872,932, Cl. 156-151.000.
Yoshimura, Hiroshi, to Hakko Metal Industries Limited. Electric soldering iron. 4,873,608, Cl. 361-220.000.
Yoshimura, Katsuji; Kozuki, Susumu; Edakubo, Hiroo; and Sato, Chikara, to Canon Kabushiki Kaisha. Video signal reproducing apparatus with memory. 4,873,587, Cl. 360-9.100.
Yoshinaga, Kazuo: *See*—
Nohira, Hiroyuki; Kamei, Masanao; Nakamura, Shinichi; Yoshinaga, Kazuo; Kai, Mariko; and Katagiri, Kazuharu, 4,873,018, Cl. 252-299.010.
Yoshinaga, Yoshitaka: *See*—
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Yoshino, Toshio: *See*—
Kajikawa, Teruo; and Yoshino, Toshio, 4,872,930, Cl. 156-72.000.
Yoshioka, Nobuyuki; Fujiwara, Nobuo; and Watakabe, Yaichirou, to Mitsubishi Denki Kabushiki Kaisha. X-ray mask and a manufacture method therefor. 4,873,162, Cl. 430-5.000.
Yoshioka, Takao; Kanai, Tsutomu; Aizawa, Yuichi; Horikoshi, Hiroyoshi; and Hasegawa, Kazuo, to Sankyo Company Limited. Thiazolidinone derivatives, their preparation and their use. 4,873,255, Cl. 514-369.000.
Yoshitoshi, You: *See*—
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Young, Craig A.: *See*—
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Young, James C.: *See*—
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Young, John M.: *See*—
Krantz, Alexander; and Young, John M., 4,873,232, Cl. 514-159.000.
Young, Lawrence R.: *See*—
Fulton, Steven J.; Spehrley, Charles W., Jr.; and Young, Lawrence R., 4,873,134, Cl. 428-156.000.
Young, William A.; Ko, Wai-Shing; Davidson, Curtis R.; and Whitehurst, Thomas, to Pittway Corporation. Infrared actuated control switch assembly. 4,873,469, Cl. 315-155.000.
Youtz, Stephen E.: *See*—
Mierzwinski, Eugene P.; Grunden, Michael T.; and Youtz, Stephen E., 4,872,828, Cl. 431-16.000.
Yuasa, Satoshi: *See*—
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Yue, Zheng. Hydraulic pumps or motors and hydrostatic transmitting systems. 4,872,536, Cl. 188-290.000.
Yui, Hiroshi; Okamura, Michiya; Ikeda, Masakazu; and Matsuo, Norio, to Mitsubishi Petrochemical Co., Ltd. Polyacetal resin composition. 4,873,282, Cl. 524-496.000.
Yui, Nobuhiko: *See*—
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Yukawa, Isao; and Tada, Yasuji, to Disco Abrasive Systems, Ltd. Cutter. 4,872,289, Cl. 51-5.00R.
Yunoki, Yutaka: *See*—
Katoh, Akira; Ida, Masatoshi; Yunoki, Yutaka; Harada, Hisayuki; Inoue, Manabu; and Fukuda, Yoshio, 4,873,580, Cl. 358-335.000.
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Zackl, Bernd: *See*—
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Zahn, Markus: *See*—
Melcher, James R.; Morin, Alfred J., II; and Zahn, Markus, 4,873,489, Cl. 324-453.000.
Zahn, Wolfgang; Fursich, Manfred; Nitsch, Wilhelm; Rauh, Hans-Jurgen; and Treiber, Helmut, to AGFA-Gevaert Aktiengeselischaft. Color printing method and apparatus. 4,873,546, Cl. 355-38.000.
Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai: *See*—
Umezawa, Sumio; Tsuchiya, Tsutomu; Takeuchi, Tomio; Umezawa, Kazuo; Takahashi, Yoshiaki; Shitara, Tetsuo; Kobayashi, Yoshihiko; and Takagi, Yasushi, 4,873,225, Cl. 514-41.000.
Zakim, David: *See*—
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Zamora, Antonio: *See*—
Frisch, Rudolf A.; and Zamora, Antonio, 4,873,634, Cl. 364-419.000.
Zandona, Oliver J., to Ashland Oil, Inc. Progressive flow cracking of coal/oil mixtures with high metals content catalyst. 4,872,971, Cl. 208-419.000.
Zehner, Georgia L.: *See*—
Proxmire, Deborah L.; Endres, Dan D.; Wilson, John C.; Johnson, Lynn A.; Zehner, Georgia L.; Boland, Leona G.; and Stevens, Robert A., 4,872,871, Cl. 604-394.000.
Zeitlin, James A.: *See*—
Mezei, Louis M.; Albom, Bradley S.; Coppock, Stan; Moehle, Stephen J.; Noorda, Brent S.; Widunas, Joseph T.; and Zeitlin, James A., 4,873,633, Cl. 364-413.080.
Zelenka, Lyn: *See*—
Zelenka, Zdenek; and Zelenka, Lyn, 4,872,583, Cl. 220-94.00R.
Zelenka, Zdenek; and Zelenka, Lyn. Handle structure for paint container. 4,872,583, Cl. 220-94.00R.
Zellweger Uster Ltd: *See*—
Robertson, Peter M.; and Suter, Erwin, 4,873,057, Cl. 422-75.000.
Zhilin, Vitaly A.: *See*—
Arbeniev, Alexandr S.; Ignatiev, Alexandr A.; Zhilin, Vitaly A.; Melnikov, Alexandr S.; and Tomskikh, Sergei F., 4,872,760, Cl. 366-7.000.
Zimmer, Gero, to Productech Reflow Solder Equipment Inc. Heated tool with stop mechanism. 4,872,604, Cl. 228-9.000.
Zimmermann, Gunther; Friedrich, Reinhard; Nantt, Wolfgang; and Weissert, Wolfgang, to Andreas Stihl. Closure for a fuel tank. 4,872,587, Cl. 220-375.000.
Zingerman, Joei R., to Merck & Co., Inc. Controlled release bolus device. 4,872,873, Cl. 604-892.100.
Zitomer, Bernard: *See*—
Shadrach III, William S.; Mandler, Michael; Moch, Ihor D.; Zitomer, Bernard; and Stewart II, John L., 4,872,555, Cl. 206-459.000.
Zollinger, Ezra J. Fertilizer injecting implement and method. 4,872,412, Cl. 111-121.000.
Zusmanovsky, Zinovy A.: *See*—
Tsirjulnikov, Moisei V.; and Zusmanovsky, Zinovy A., 4,872,447, Cl. 128-79.000.
501 Abbeybench Limited: *See*—
Jenkinson, Margaret; and Dunne, John, 4,872,290, Cl. 51-109.00R.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 10TH DAY OF OCTOBER, 1989

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Advanced Mechanical Technology, Inc.: *See*—
Gerstmann, Joseph; and Vasilakis, Andrew D., Re. 33,082, Cl. 122-20.00B.

American Home Products Corporation: *See*—
Jones, Flave L.; and Kelly, Mark L., Re. 33,088, Cl. 346-1.100.

Bradford, Michael P.; Parkinson, Gerald W.; and Grant, Ross M., to United Technologies Corporation. Electric power distribution and load transfer system. Re. 33,087, Cl. 307-64.000.

Bru, Jean. Process for manufacturing effervescent granules and tablets and high efficiency granulation tower for such process. Re. 33,086, Cl. 424-44.000.

Gerstmann, Joseph; and Vasilakis, Andrew D., to Advanced Mechanical Technology, Inc. Combustion product condensing water heater. Re. 33,082, Cl. 122-20.00B.

Grant, Ross M.: *See*—
Bradford, Michael P.; Parkinson, Gerald W.; and Grant, Ross M., Re. 33,087, Cl. 307-64.000.

Jones, Flave L.; and Kelly, Mark L., to American Home Products Corporation. Method and apparatus for recording medical information on a strip chart. Re. 33,088, Cl. 346-1.100.

Kelly, Mark L.: *See*—
Jones, Flave L.; and Kelly, Mark L., Re. 33,088, Cl. 346-1.100.

Maples, James A.: *See*—
Pepper, Robert B.; and Maples, James A., Re. 33,089, Cl. 364-480.000.

Parkinson, Gerald W.: *See*—
Bradford, Michael P.; Parkinson, Gerald W.; and Grant, Ross M., Re. 33,087, Cl. 307-64.000.

Pellegrino, Raymond W. Controlled dispensing apparatus. Re. 33,083, Cl. 222-181.000.

Pepper, Robert B.; and Maples, James A. Position sensing and indicating device. Re. 33,089, Cl. 364-480.000.

Petersen, Ross K. Precleaner. Re. 33,085, Cl. 55-327.000.

Ranson, Jean-Francois. Intermittently operating pneumatic device for pumping solid-carrying liquids and slurries. Re. 33,084, Cl. 406-50.000.

United Technologies Corporation: *See*—
Bradford, Michael P.; Parkinson, Gerald W.; and Grant, Ross M., Re. 33,087, Cl. 307-64.000.

Vasilakis, Andrew D.: *See*—
Gerstmann, Joseph; and Vasilakis, Andrew D., Re. 33,082, Cl. 122-20.00B.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Curran, William F. Massaging device. B1 4,506,660, 10-10-89, Cl. 128-57.000.

Du Pont de Nemours, E. I., and Company: *See*—
Levitt, George, B1 4,659,369, Cl. 71-92.000.

Levitt, George, to Du Pont de Nemours, E. I., and Company. Herbicidal acetals and ketals. B1 4,659,369, 10-10-89, Cl. 71-92.000.

Nakamura, Hitoshi: *See*—
Takahashi, Akio; Tsumuki, Chiaki; and Nakamura, Hitoshi, B1 4,236,923, Cl. 419-6.000.

Takahashi, Akio; Tsumuki, Chiaki; and Nakamura, Hitoshi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Method of metallurgically joining a fitting to a shaft. B1 4,236,923, 10-10-89, Cl. 419-6.000.

Toyota Jidosha Kogyo Kabushiki Kaisha: *See*—
Takahashi, Akio; Tsumuki, Chiaki; and Nakamura, Hitoshi, B1 4,236,923, Cl. 419-6.000.

Tsumuki, Chiaki: *See*—
Takahashi, Akio; Tsumuki, Chiaki; and Nakamura, Hitoshi, B1 4,236,923, Cl. 419-6.000.

Uht, Frank O., to Uht, R. Wayne. Backwash baffle and stabilizing device for propeller driven watercraft. B1 3,965,838, 10-10-89, Cl. 114-145.00A.

Uht, R. Wayne: *See*—
Uht, Frank O., B1 3,965,838, Cl. 114-145.00A.

LIST OF DESIGN PATENTEES

Aavid Engineering, Inc.: *See*—
McCarthy, Alfred F., 303,951, Cl. D13-23.000.

Alco Industries, Inc.: *See*—
Goetz, Charles R., 303,885, Cl. D6-484.000.

Alderton, Gordon H.: *See*—
Gill, Neil F.; and Alderton, Gordon H., 303,923, Cl. D8-394.000.

AMP Incorporated: *See*—
Hatfield, John G., 303,917, Cl. D8-51.000.

Ancona, Bruce: *See*—
Ancona, Jane; and Ancona, Bruce, 303,899, Cl. D7-71.000.
Ancona, Jane; and Ancona, Bruce, 303,900, Cl. D7-71.000.

Ancona, Jane; and Ancona, Bruce, to M. Kamenstein, Inc. Wood spice rack. 303,899, 10-10-89, Cl. D7-71.000.

Ancona, Jane; and Ancona, Bruce, to M. Kamenstein, Inc. Plastic spice rack. 303,900, 10-10-89, Cl. D7-71.000.

Anderson, Georgette M. Pie crust shield. 303,908, 10-10-89, Cl. D7-387.000.

Arai, Shiro. Twin function graphic equalizer. 303,971, 10-10-89, Cl. D14-217.000.

Argyropoulos, James, to Cherokee Group, The. High top moccasin toe walker. 303,867, 10-10-89, Cl. D2-268.000.

Argyropoulos, James, to Cherokee Group, The. Low top moccasin toe walker. 303,868, 10-10-89, Cl. D2-268.000.

Asahi Corporation: *See*—
Driscoll, Dennis, 303,871, Cl. D2-320.000.

Asou, Tohru, to Mitsubishi Denki Kabushiki Kaisha. Outdoor video display unit. 303,962, 10-10-89, Cl. D14-128.000.

Avia Group International, Inc.: *See*—
Selbiger, Lawrence, 303,870, Cl. D2-314.000.

Baus, Heinz G. Mirrored cabinet. 303,894, 10-10-89, Cl. D6-559.000.

Baus, Heinz G. Mirrored cabinet. 303,895, 10-10-89, Cl. D6-559.000.

Baus, Heinz G. Mirrored cabinet. 303,896, 10-10-89, Cl. D6-561.000.

Benyo, John R.: *See*—
Scheid, William J.; McKee, John M.; Kurcbart, Robert; Ranalletta, Joseph V.; Benyo, John R.; and Toth, Richard J., 303,969, Cl. D14-191.000.

Blochlinger, Alfred; Collins, Christopher; Petroff, Cvetan; and Tench, Wallace, to McPherson's Limited. Utility knife or similar article. 303,921, 10-10-89, Cl. D8-98.000.

Bonstead, Douglas L.; and Dixon, Herbert O., to Deflecta-Shield Corporation. Sun visor. 303,948, 10-10-89, Cl. D12-191.000.

Bottcher, Charles E. Corner support bracket for plaques or the like. 303,942, 10-10-89, Cl. D11-164.000.

Bridgestone Corporation: *See—*
Himuro, Yasuo; and Masuda, Hidenori, 303,944, Cl. D12-146.000.
Tsuda, Toru; and Sakamaki, Yuji, 303,945, Cl. D12-147.000.

Brown, John M. Illuminated menu display panel. 303,893, 10-10-89, Cl. D6-559.000.

Brussing, Bernd, to Hans Friedrich Hefendehl. Diskette storage container. 303,873, 10-10-89, Cl. D3-35.000.

Buchweitz, Albert F., Jr.; and Heggeland, Bruce, to IPD Innovative Plastic Designs Inc. Support leg for computer equipment. 303,988, 10-10-89, Cl. D18-23.000.

Burgess, Samuel C. Seaplane with pontoons. 303,950, 10-10-89, Cl. D12-324.000.

Butler, Mark R. Hand held tool for packing and loading of leaves. 303,912, 10-10-89, Cl. D8-1.000.

Canon Kabushiki Kaisha: *See—*
Kimura, Hiroyuki; and Hara, Yoshiaki, 303,976, Cl. D16-134.000.
Matsuoka, Fumiya; and Hasegawa, Takeshi, 303,982, Cl. D18-7.000.
Takemata, Keiko; and Yoshioka, Eiichi, 303,981, Cl. D18-7.000.

Cartier International B.V.: *See—*
Perrin, Alain-Dominique, 303,940, Cl. D11-13.000.
Perrin, Alain-Dominique, 303,941, Cl. D11-21.000.

Cherokee Group, The: *See—*
Argyropoulos, James, 303,867, Cl. D2-268.000.
Argyropoulos, James, 303,868, Cl. D2-268.000.

Chromcraft Furniture Corporation: *See—*
Stafford, John R., 303,888, Cl. D6-502.000.

Ciarfeo, Elizabeth A.: *See—*
King, M. Frazier, Jr.; and Ciarfeo, Elizabeth A., 303,937, Cl. D10-39.000.

Clarence J. Venne, Inc.: *See—*
Venne, Clarence J.; and Venne, Richard A., 303,926, Cl. D9-349.000.

Clemens, George S.; and Mackay, Spencer L., to Dental Research Corporation. Combined electric periodontal brush and mounting bracket. 303,876, 10-10-89, Cl. D4-101.000.

Coleman, Ronald. Pennant clock. 303,935, 10-10-89, Cl. D10-6.000.

Collins, Christopher: *See—*
Blochlinger, Alfred; Collins, Christopher; Petroff, Cvetan; and Tench, Wallace, 303,921, Cl. D8-98.000.

Collins, Martin W.; and Smith, William B., to SoundScape Speakers, Inc. Outdoor loudspeaker. 303,970, 10-10-89, Cl. D14-216.000.

Colvin, Davis S., to Colvin, Davis S. Double-ended box wrench. 303,916, 10-10-89, Cl. D8-22.000.

Combined Optical Industries Limited: *See—*
Steel, Veronica G.; and Francis, David F., 303,977, Cl. D16-135.000.

Concepcion, Juan F.: *See—*
Lucas, Michael P.; Tabor, Robert; Gerstman, Richard B.; and Concepcion, Juan F., 303,865, Cl. D1-109.000.
Lucas, Michael P.; Tabor, Robert; Gerstman, Richard B.; and Concepcion, Juan F., 303,866, Cl. D1-109.000.

Cranston, William V., III; Martin, Randall W.; and Young, Mark A., to International Business Machines Corporation. Card shroud enclosure for an industrial computer. 303,958, 10-10-89, Cl. D14-114.000.

Deblue, Jacqueline, to Leonard S.A. Wristwatch. 303,936, 10-10-89, Cl. D10-32.000.

Decor Corporation Proprietary Limited, The: *See—*
Wolfenden, Anthony H., 303,904, Cl. D7-317.000.

Deflecta-Shield Corporation: *See—*
Bonstead, Douglas L.; and Dixon, Herbert O., 303,948, Cl. D12-191.000.

DeLucchi, Michele: *See—*
Sottsas, Ettore; and DeLucchi, Michele, 303,882, Cl. D6-422.000.

Dental Research Corporation: *See—*
Clemens, George S.; and Mackay, Spencer L., 303,876, Cl. D4-101.000.

Ditzik, Richard J. Computer display terminal. 303,956, 10-10-89, Cl. D14-106.000.

Dixon, Herbert O.: *See—*
Bonstead, Douglas L.; and Dixon, Herbert O., 303,948, Cl. D12-191.000.

Drew, Douglas, to Noma Inc. Electrical connector. 303,952, 10-10-89, Cl. D13-30.000.

Drew, Douglas, to Noma Inc. Electrical connector. 303,953, 10-10-89, Cl. D13-30.000.

Driscoll, Dennis, to Asahi Corporation. Sole. 303,871, 10-10-89, Cl. D2-320.000.

Durand, Jean-Jacques. Platter or similar article. 303,898, 10-10-89, Cl. D7-28.000.

Durand, Jean-Jacques. Perfume bottle. 303,930, 10-10-89, Cl. D9-403.000.

Durham, Ira M., Jr., to Methodist Hospital System, The. Headwall unit for hospital rooms. 303,889, 10-10-89, Cl. D6-505.000.

Duro-Dyne Corporation: *See—*
Hinden, Milton; and Lyons, John, 303,914, Cl. D8-14.100.

Eastern Company, The: *See—*
Russell, Richard H.; Kaiser, David W.; and O'Grady, Richard M., 303,922, Cl. D8-321.000.

Francis, David F.: *See—*
Steel, Veronica G.; and Francis, David F., 303,977, Cl. D16-135.000.

Franey, Joseph M. Clamp for filleting fish. 303,901, 10-10-89, Cl. D7-99.000.

Fratelli Guzzini S.p.A.: *See—*
Gecchelin, Bruno, 303,902, Cl. D7-102.000.

Fritzsche, Jochen, to Siemens Aktiengesellschaft. Telephone station. 303,966, 10-10-89, Cl. D14-151.000.

Fujitsu Limited: *See—*
Kokihara, Mitsuharu, 303,963, Cl. D14-138.000.

Fukushima, Kazuyuki: *See—*
Suyama, Tsutomu; Wakamatsu, Masaharu; Yamamuro, Takahiko; and Fukushima, Kazuyuki, 303,959, Cl. D14-114.000.

Fukutome, Satoshi, to Sharp Kabushiki Kaisha. Combination handset transceiver and message recorder telephone stand therefor. 303,964, 10-10-89, Cl. D14-141.000.

Fusco, Vincent: *See—*
Michels, Dennis; Kaplan, Alan; and Fusco, Vincent, 303,954, Cl. D14-155.000.

Gecchelin, Bruno, to Fratelli Guzzini S.p.A. Server for cakes, pies and the like. 303,902, 10-10-89, Cl. D7-102.000.

General Foods Corp.: *See—*
Mileos, George, 303,925, Cl. D9-306.000.

Gerstman, Richard B.: *See—*
Lucas, Michael P.; Tabor, Robert; Gerstman, Richard B.; and Concepcion, Juan F., 303,865, Cl. D1-109.000.
Lucas, Michael P.; Tabor, Robert; Gerstman, Richard B.; and Concepcion, Juan F., 303,866, Cl. D1-109.000.

Gibert, Jose M. P., to Industria Auxiliar Manodomesticos, S.A. Vacuum flask. 303,905, 10-10-89, Cl. D7-317.000.

Gickler, Alan E., to Johnson Manufacturing Company. Combined radiator tab lifter and crimper. 303,918, 10-10-89, Cl. D8-52.000.

Gill, Neil F.; and Alderton, Gordon H., to Lindapter International Limited. Grid clamp for support beam or the like. 303,923, 10-10-89, Cl. D8-394.000.

Goetz, Charles R., to Alco Industries, Inc. Table. 303,885, 10-10-89, Cl. D6-484.000.

Gold Star Co., Ltd.: *See—*
Shin, Myung C., 303,967, Cl. D14-162.000.

Goldsmith, Howard G., to Todd Enterprises, Inc. Foldable seat for use primarily in a boat. 303,878, 10-10-89, Cl. D6-368.000.

Goodyear Tire & Rubber Company, The: *See—*
Graas, Maurice, 303,946, Cl. D12-147.000.

Graas, Maurice, to Goodyear Tire & Rubber Company, The. Tire. 303,946, 10-10-89, Cl. D12-147.000.

Grotsch, Gerald, to J. S. Staedtler GmbH & Co. Retractable holder for an eraser or similar article. 303,992, 10-10-89, Cl. D19-53.000.

Hans Friedrich Hefendehl: *See—*
Brussing, Bernd, 303,873, Cl. D3-35.000.

Hara, Yoshiaki: *See—*
Kimura, Hiroyuki; and Hara, Yoshiaki, 303,976, Cl. D16-134.000.

Hasegawa, Takeshi: *See—*
Matsuoka, Fumiya; and Hasegawa, Takeshi, 303,982, Cl. D18-7.000.

Hatfield, John G., to AMP Incorporated. Multiple stroke ratchet tool for crimping, cutting or the like. 303,917, 10-10-89, Cl. D8-51.000.

Hedenberg, Conny; and Tillner, Alfred. Apparatus for applying seat covers to automobile backrests or the like. 303,975, 10-10-89, Cl. D15-199.000.

Heggeland, Bruce: *See—*
Buchweitz, Albert F., Jr.; and Heggeland, Bruce, 303,988, Cl. D18-23.000.

Helstab, Edmond J., to Northern Telecom Limited. Base for telephone set. 303,965, 10-10-89, Cl. D14-142.000.

Higson, Donnie W.; and Higson, Michael E. Foldable beach equipment carrier. 303,883, 10-10-89, Cl. D6-429.000.

Higson, Michael E.: *See—*
Higson, Donnie W.; and Higson, Michael E., 303,883, Cl. D6-429.000.

Hill, Ernest H. Holster. 303,875, 10-10-89, Cl. D3-101.000.

Himuro, Yasuo; and Masuda, Hidenori, to Bridgestone Corporation. Automobile tire. 303,944, 10-10-89, Cl. D12-146.000.

Hinden, Milton; and Lyons, John, to Duro-Dyne Corporation. Caulking gun. 303,914, 10-10-89, Cl. D8-14.100.

Honda Giken Kogyo Kabushiki Kaisha: *See—*
Nakatsuka, Toshiki, 303,949, Cl. D12-211.000.

Iacovelli, Marc R., to Rally Manufacturing, Inc. Combined digital clock and compass for vehicles. 303,933, 10-10-89, Cl. D10-2.000.

Iacovelli, Marc R., to Rally Manufacturing, Inc. Combined digital clock, thermometer and compass for vehicles. 303,934, 10-10-89, Cl. D10-2.000.

Iacovelli, Marc R., to Rally Manufacturing, Inc. Combined thermometer and compass for vehicles. 303,938, 10-10-89, Cl. D10-53.000.

Industria Auxiliar Manodomesticos, S.A.: *See—*
Gibert, Jose M. P., 303,905, Cl. D7-317.000.

Inomata, Hideko: *See—*
Kiyooka, Katsumi; Ueno, Tetsuo; Iramina, Keiko; and Inomata, Hideko, 303,973, Cl. D15-10.000.

International Business Machines Corporation: *See—*
Cranston, William V., III; Martin, Randall W.; and Young, Mark A., 303,958, Cl. D14-114.000.

IPD Innovative Plastic Designs Inc.: *See—*
Buchweitz, Albert F., Jr.; and Heggeland, Bruce, 303,988, Cl. D18-23.000.

Iramina, Keiko: *See—*
Kiyooka, Katsumi; Ueno, Tetsuo; Iramina, Keiko; and Inomata, Hideko, 303,973, Cl. D15-10.000.

Iwahashi, Wataru, to Sharp Kabushiki Kaisha. Microwave oven. 303,907, 10-10-89, Cl. D7-351.000.

J. S. Staedtler GmbH & Co.: *See—*
Grotsch, Gerald, 303,992, Cl. D19-53.000.
Jacobs, Rexy. Sports shoe. 303,869, 10-10-89, Cl. D2-310.000.
Johnson Manufacturing Company: *See—*
Gickler, Alan E., 303,918, Cl. D8-52.000.
Kaiser, David W.: *See—*
Russell, Richard H.; Kaiser, David W.; and O'Grady, Richard M., 303,922, Cl. D8-321.000.
Kandel, Frederick S., to Majestic Tool Corp. Handle for a screwdriver. 303,920, 10-10-89, Cl. D8-83.000.
Kaplan, Alan: *See—*
Michels, Dennis; Kaplan, Alan; and Fusco, Vincent, 303,954, Cl. D14-155.000.
Karr, Craig C. Power roller element. 303,974, 10-10-89, Cl. D15-126.000.
Kates, Fred W.; and Yeranossian, Karl, to Revlon, Inc. Combined display and dispenser rack. 303,880, 10-10-89, Cl. D6-408.000.
Kato, Shuzo; Sakama, Satoru; and Takahashi, Tamihei, to NCR Corporation. Receipt-journal printer or similar article. 303,979, 10-10-89, Cl. D18-13.000.
Kato, Shuzo; and Watanabe, Shingo, to NCR Corporation. Slip printer or similar article. 303,983, 10-10-89, Cl. D18-13.000.
Kato, Shuzo; and Takahashi, Tamihei, to NCR Corporation. Receipt/-slip printer or similar article. 303,986, 10-10-89, Cl. D18-13.000.
Kato, Shuzo; Nakamura, Yasushi; and Kusayanagi, Masao, to NCR Corporation. Receipt/journal printer or similar article. 303,987, 10-10-89, Cl. D18-13.000.
Katsunori, Takagi: *See—*
Toru, Kawamura; and Katsunori, Takagi, 303,960, Cl. D14-118.000.
Kazunori, Mano: *See—*
Yoshiaki, Ueda; and Kazunori, Mano, 303,903, Cl. D7-309.000.
Kim, Suk E., to SKC Limited. Reel for a video tape recorder. 303,961, 10-10-89, Cl. D14-122.000.
Kimura, Hiroyuki; and Hara, Yoshiaki, to Canon Kabushiki Kaisha. Lens for camera. 303,976, 10-10-89, Cl. D16-134.000.
King, M. Frazier, Jr.; and Ciarfeo, Elizabeth A. Watch with neon-like illumination ring. 303,937, 10-10-89, Cl. D10-39.000.
Kiyooka, Katsumi; Ueno, Tetsuo; Iramina, Keiko; and Inomata, Hideko, to Komatsu Zenoah Company. Portable internal combustion engine and tools. 303,973, 10-10-89, Cl. D15-10.000.
Klein, Otto G. Corner protector. 303,924, 10-10-89, Cl. D8-403.000.
Knutson, Kevin M. Beverage can opening ring. 303,915, 10-10-89, Cl. D8-18.000.
Kohler Co.: *See—*
Reid, Mary J., 303,886, Cl. D6-499.000.
Reid, Mary J., 303,887, Cl. D6-499.000.
Kokihara, Mitsuharu, to Fujitsu Limited. Portable telephone. 303,963, 10-10-89, Cl. D14-138.000.
Komatsu Zenoah Company: *See—*
Kiyooka, Katsumi; Ueno, Tetsuo; Iramina, Keiko; and Inomata, Hideko, 303,973, Cl. D15-10.000.
Korner, Lucy. Book. 303,989, 10-10-89, Cl. D19-26.000.
Koyama, Keiichi: *See—*
Shiozawa, Hajime; and Koyama, Keiichi, 303,955, Cl. D14-100.000.
Kurcbart, Robert: *See—*
Scheid, William J.; McKee, John M.; Kurcbart, Robert; Ranalletta, Joseph V.; Benyo, John R.; and Toth, Richard J., 303,969, Cl. D14-191.000.
Kusayanagi, Masao: *See—*
Kato, Shuzo; Nakamura, Yasushi; and Kusayanagi, Masao, 303,987, Cl. D18-13.000.
Leap, Earl J. Tree soaker. 303,913, 10-10-89, Cl. D8-1.000.
Lee, George C. Candy dispenser. 303,994, 10-10-89, Cl. D20-7.000.
Lee, Raymond N. Paper roll holder. 303,891, 10-10-89, Cl. D6-523.000.
Leonard S.A.: *See—*
Deblue, Jacqueline, 303,936, Cl. D10-32.000.
Lindapter International Limited: *See—*
Gill, Neil F.; and Alderton, Gordon H., 303,923, Cl. D8-394.000.
Lucas, Michael P.; Tabor, Robert; Gerstman, Richard B.; and Concepcion, Juan F., to Nabisco Brands, Inc. Cookie having openings therethrough. 303,865, 10-10-89, Cl. D1-109.000.
Lucas, Michael P.; Tabor, Robert; Gerstman, Richard B.; and Concepcion, Juan F., to Nabisco Brands, Inc. Cookie having openings therethrough. 303,866, 10-10-89, Cl. D1-109.000.
Lyons, John: *See—*
Hinden, Milton; and Lyons, John, 303,914, Cl. D8-14.100.
M. Kamenstein, Inc.: *See—*
Ancona, Jane; and Ancona, Bruce, 303,899, Cl. D7-71.000.
Ancona, Jane; and Ancona, Bruce, 303,900, Cl. D7-71.000.
Mackay, Spencer L.: *See—*
Clemens, George S.; and Mackay, Spencer L., 303,876, Cl. D4-101.000.
Majestic Tool Corp.: *See—*
Kandel, Frederick S., 303,920, Cl. D8-83.000.
Markus, Isidoro N. Modular office work station. 303,881, 10-10-89, Cl. D6-421.000.
Martin, Randall W.: *See—*
Cranston, William V., III; Martin, Randall W.; and Young, Mark A., 303,958, Cl. D14-114.000.
Masuda, Hidenori: *See—*
Himuro, Yasuo; and Masuda, Hidenori, 303,944, Cl. D12-146.000.
Matsuoka, Fumiya; and Hasegawa, Takeshi, to Canon Kabushiki Kaisha. Desk-top electronic calculator. 303,982, 10-10-89, Cl. D18-7.000.
Matsushita Electric Industrial Co., Ltd.: *See—*
Yoshiaki, Ueda; and Kazunori, Mano, 303,903, Cl. D7-309.000.
McCarthy, Alfred F., to Aavid Engineering, Inc. Heat-sink cover for leadless electronic chip-carrier sockets. 303,951, 10-10-89, Cl. D13-23.000.
McKee, John M.: *See—*
Scheid, William J.; McKee, John M.; Kurcbart, Robert; Ranalletta, Joseph V.; Benyo, John R.; and Toth, Richard J., 303,969, Cl. D14-191.000.
McPherson's Limited: *See—*
Blochlinger, Alfred; Collins, Christopher; Petroff, Cvetan; and Tench, Wallace, 303,921, Cl. D8-98.000.
Mednis, Juris M., to Universal Symetrics Corporation. Bottle. 303,928, 10-10-89, Cl. D9-375.000.
Methodist Hospital System, The: *See—*
Durham, Ira M., Jr., 303,889, Cl. D6-505.000.
Michels, Dennis; Kaplan, Alan; and Fusco, Vincent, to Sound Sender, Inc. Tape player adapter for car radios. 303,954, 10-10-89, Cl. D14-155.000.
Mileos, George, to General Foods Corp. Combined package and dispenser for extrudible comestibles. 303,925, 10-10-89, Cl. D9-306.000.
Miller, Jack V.: *See—*
Miller, Ruth E.; and Miller, Jack V., 303,931, Cl. D9-415.000.
Miller, Ruth E.; and Miller, Jack V. Book blister package. 303,931, 10-10-89, Cl. D9-415.000.
Minami, Hiroo, to Yoshida Kogyo K. K. Slider pull tab for slide fastener. 303,943, 10-10-89, Cl. D11-221.000.
Minolta Camera Kabushiki Kaisha: *See—*
Toru, Kawamura; and Katsunori, Takagi, 303,960, Cl. D14-118.000.
Mitsubishi Denki Kabushiki Kaisha: *See—*
Asou, Tohru, 303,962, Cl. D14-128.000.
Suyama, Tsutomu; Wakamatsu, Masaharu; Yamamuro, Takahiko; and Fukushima, Kazuyuki, 303,959, Cl. D14-114.000.
Mohasco Upholstered Furniture Corporation: *See—*
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Motorola, Inc.: *See—*
Scheid, William J.; McKee, John M.; Kurcbart, Robert; Ranalletta, Joseph V.; Benyo, John R.; and Toth, Richard J., 303,969, Cl. D14-191.000.
Murphy, Kent D. Miniature pen with cap. 303,991, 10-10-89, Cl. D19-48.000.
Nabisco Brands, Inc.: *See—*
Lucas, Michael P.; Tabor, Robert; Gerstman, Richard B.; and Concepcion, Juan F., 303,865, Cl. D1-109.000.
Lucas, Michael P.; Tabor, Robert; Gerstman, Richard B.; and Concepcion, Juan F., 303,866, Cl. D1-109.000.
Nakamura, Shingo; and Shibuya, Norio, to NEC Corporation. Optical disk unit for electronic computers. 303,957, 10-10-89, Cl. D14-109.000.
Nakamura, Yasushi: *See—*
Kato, Shuzo; Nakamura, Yasushi; and Kusayanagi, Masao, 303,987, Cl. D18-13.000.
Nakatsuka, Toshiki, to Honda Giken Kogyo Kabushiki Kaisha. Vehicle wheel. 303,949, 10-10-89, Cl. D12-211.000.
NCR Corporation: *See—*
Kato, Shuzo; Sakama, Satoru; and Takahashi, Tamihei, 303,979, Cl. D18-13.000.
Kato, Shuzo; and Watanabe, Shingo, 303,983, Cl. D18-13.000.
Kato, Shuzo; and Takahashi, Tamihei, 303,986, Cl. D18-13.000.
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NEC Corporation: *See—*
Nakamura, Shingo; and Shibuya, Norio, 303,957, Cl. D14-109.000.
Uozu...i, Takao, 303,972, Cl. D14-231.000.
Nishibori, Hiroshi, to Sharp Kabushiki Kaisha. Microwave oven. 303,906, 10-10-89, Cl. D7-351.000.
Noma Inc.: *See—*
Drew, Douglas, 303,952, Cl. D13-30.000.
Drew, Douglas, 303,953, Cl. D13-30.000.
Northern Telecom Limited: *See—*
Helstab, Edmond J., 303,965, Cl. D14-142.000.
Norton, Ian F., to Union Carbide Canada Limited. Bench. 303,877, 10-10-89, Cl. D6-349.000.
O'Grady, Richard M.: *See—*
Russell, Richard H.; Kaiser, David W.; and O'Grady, Richard M., 303,922, Cl. D8-321.000.
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Sottsas, Ettore; and DeLucchi, Michele, 303,882, Cl. D6-422.000.
Parker, William G. Locking tube roller. 303,892, 10-10-89, Cl. D6-541.000.
Pasillas, Norbert. Chef's hat bottle cap. 303,932, 10-10-89, Cl. D9-451.000.
Pate, Louis. Combined hairstyling scissors-comb. 303,919, 10-10-89, Cl. D8-57.000.
Pentel of America, Ltd.: *See—*
Petterson, Tor, 303,990, Cl. D19-48.000.
Perrin, Alain-Dominique, to Cartier International B.V. Link chain for bracelet or the like. 303,940, 10-10-89, Cl. D11-13.000.
Perrin, Alain-Dominique, to Cartier International B.V. Link chain for bracelet or the like. 303,941, 10-10-89, Cl. D11-21.000.
Petroff, Cvetan: *See—*
Blochlinger, Alfred; Collins, Christopher; Petroff, Cvetan; and Tench, Wallace, 303,921, Cl. D8-98.000.
Petterson, Tor, to Pentel of America, Ltd. Pen. 303,990, 10-10-89, Cl. D19-48.000.
Phillips, Katherine A. Pillow. 303,897, 10-10-89, Cl. D6-601.000.

Phinney, Raymond C., to Quaker Oats Company, The. Combined video camera and recorder. 303,978, 10-10-89, Cl. D16-202.000.

Pilot, Douglas J. Toilet paper guard. 303,890, 10-10-89, Cl. D6-523.000.

Plus Corporation: *See—*
Tamamura, Hiromi, 303,872, Cl. D3-18.000.

Procter & Gamble Company, The: *See—*
Ross, Samuel, 303,929, Cl. D9-376.000.

Quaker Oats Company, The: *See—*
Phinney, Raymond C., 303,978, Cl. D16-202.000.

Rally Manufacturing, Inc.: *See—*
Iacovelli, Marc R., 303,933, Cl. D10-2.000.
Iacovelli, Marc R., 303,934, Cl. D10-2.000.
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Ranalletta, Joseph V.: *See—*
Scheid, William J.; McKee, John M.; Kurcbart, Robert; Ranalletta, Joseph V.; Benyo, John R.; and Toth, Richard J., 303,969, Cl. D14-191.000.

Reid, Mary J., to Kohler Co. Table leg or the like. 303,886, 10-10-89, Cl. D6-499.000.

Reid, Mary J., to Kohler Co. Table leg or the like. 303,887, 10-10-89, Cl. D6-499.000.

Revlon, Inc.: *See—*
Kates, Fred W.; and Yeranossian, Karl, 303,880, Cl. D6-408.000.
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347 4,872,573

CLASS 219

10.43 4,873,407
10.55 B 4,873,408
10.55 E 4,873,406
10.55 M 4,873,409
56.1 4,873,410
93 4,873,411
95 4,873,412
121.6 4,873,417
4,873,418
121.64 4,873,415
4,873,416
121.68 4,873,413
121.7 4,873,414
125.1 4,873,419
341 4,873,421
370 4,873,422
390 4,873,423
521 4,873,424

CLASS 220

1 T 4,872,582
1.5 4,872,574
3.3 4,872,575
83 4,872,576
85 CH 4,872,577
94 R 4,872,583
201 4,872,584
307 4,872,586
334 4,872,585
375 4,872,587
403 4,872,588
410 4,872,589
457 4,872,590

CLASS 221

3 4,872,591
6 4,872,592
231 4,872,593

CLASS 222

173 4,872,594
181 Re.33,083
209 4,872,595
380 4,872,596
541 4,872,597
630 4,872,598

CLASS 224

208 4,872,599
245 4,872,600

CLASS 225

38 4,872,601

CLASS 226

196 4,872,602

CLASS 227

97 4,872,603

CLASS 228

9 4,872,604
51 4,872,605
121 4,872,606
180.1 4,872,607

CLASS 229

2.5 EC 4,872,608
134 4,872,609

CLASS 232

17 4,872,610

CLASS 235

441 4,873,425
462 4,873,426
492 4,873,427

CLASS 239

18 4,872,611
265.19 4,872,612
280 4,872,613
533.9 4,872,614
587 4,872,615
703 4,872,616

CLASS 241

247 4,872,617

CLASS 242

4 R 4,872,618
7.21 4,872,619
85.1 4,872,622
96 4,872,623
118.11 4,872,621
118.3 4,872,620

CLASS 244

54 4,872,624
159 4,872,625

CLASS 248

63 4,872,626
168 4,872,627
178 4,872,628
231.2 4,872,629
278 4,872,630
313 4,872,631
332 4,872,632
340 4,872,633
354.3 4,872,634
406.2 4,872,635
475.1 4,872,636

CLASS 249

59 4,872,637

CLASS 250

214 DC 4,873,428
216 4,873,429
225 4,873,430
227 4,873,431
4,873,432
233 4,873,433
235 4,873,434
4,873,435
315.3 4,873,436
327.2 4,873,437
4,873,438
4,873,439
4,873,440
4,873,441
334 4,873,442
336.2 4,873,443
337 4,873,444
432 R 4,873,445
492.1 4,873,446
492.2 4,873,447
551 4,873,448
560 4,873,449

CLASS 251

54 4,872,638
61.4 4,872,639
147 4,872,640
148 4,872,641
173 4,872,642
252 4,872,643

CLASS 252

8.6 4,873,000
8.75 4,873,003
8.8 4,873,001
4,873,002
32.5 4,873,004
35 4,873,005
38 4,873,006
40.7 4,873,007
46.6 4,873,008
49.6 4,873,009
62.59 4,873,010
75 4,873,011
99 4,873,012
102 4,873,013
148 4,873,014
171 4,873,015
174.12 4,873,016
183.11 4,873,017
299.01 4,873,018
299.61 4,873,019
355 4,873,020
364 4,873,021

CLASS 254

10.5 4,872,644
4,872,645
43 4,872,646

CLASS 256

1 4,872,647

CLASS 260

404.8 4,873,023
405.5 4,873,024

CLASS 261

109 4,873,028

CLASS 264

0.5 4,873,031
1.3 4,873,029
1.5 4,873,030
4.6 4,873,035
39 4,873,032
41 4,873,033
4,873,034
46.6 4,873,036
49 4,873,037
60 4,873,038
65 4,873,039
102 4,873,040
135 4,873,041
211.24 4,873,042
237 4,873,043
257 4,873,044
259 4,873,045
288.4 4,873,046
322 4,873,047
504 4,873,048
513 4,873,049

CLASS 266

275 4,872,648

CLASS 267

136 4,872,649
140.1 4,872,650
4,872,651
4,872,652
271 4,872,653

CLASS 269

3 4,872,654
130 4,872,655
322 4,872,656
325 4,872,657

CLASS 270

39 4,872,658

CLASS 271

9 4,872,659
4,872,660
4,872,661
4,872,662
294 4,872,663

CLASS 272

69 4,872,664
70 4,872,665
75 4,872,666
123 4,872,667
130 4,872,668
132 4,872,669
134 4,872,670
137 4,872,671

CLASS 273

1 E 4,872,672
1 GF 4,872,673
26 A 4,872,674
26 E 4,872,675
58 A 4,872,677
58 H 4,872,676
61 R 4,872,678
85 R 4,872,679
86 B 4,872,680
118 R 4,872,681
153 S 4,872,682
164 4,872,683
4,872,684
169 4,872,685
176 AB 4,872,686
185 R 4,872,687
326 4,872,688

CLASS 277

9.5 4,872,689
24 4,872,690

CLASS 279

123 4,872,691

CLASS 280

30 4,872,692
4,872,693
79.4 4,872,694
257 4,872,695
281.1 4,872,696
304.5 4,872,697
605 4,872,698
661 4,872,699
677 4,872,700
703 4,872,701
708 4,872,702
804 4,872,703
808 4,872,704

CLASS 283

67 4,872,705
81 4,872,706
102 4,872,707

CLASS 285

39 4,872,708
4,872,709
81 4,872,710
88 4,872,711
341 4,872,712
381 4,872,713

CLASS 290

52 4,873,450

CLASS 292

201 4,872,714
302 4,872,715
336.3 4,872,716
340 4,872,717

CLASS 294

86.4 4,872,718

CLASS 296

34 4,872,719
39.1 4,872,720
97.2 4,872,721
214 4,872,722

CLASS 297

216 4,872,723
218 4,872,724
250 4,872,725
367 4,872,726
411 4,872,727

CLASS 298

5 4,872,728

CLASS 303

92 4,872,729
4,872,730
93 4,872,731
110 4,872,732

CLASS 307

10.1 4,873,451
4,873,452
64 Re.33,087
130 4,873,453
140 4,873,454
201 4,873,455
272.1 4,873,456
353 4,873,457
362 4,873,458
465 4,873,459
571 4,873,460

CLASS 310

47 4,873,461
49 R 4,873,462
68 B 4,873,463
249 4,873,464
361 4,873,465

CLASS 312

255 4,872,733
333 4,872,734
342 4,872,735

CLASS 313

131 R 4,873,466
360.1 4,873,467
411 4,873,468

CLASS 315

155 4,873,469
240 4,873,470
308 4,873,471
366 4,873,472

CLASS 318

434 4,873,474
489 4,873,475
568.22 4,873,476
603 4,873,477
779 4,873,478

CLASS 320

2 4,873,479

CLASS 323

229 4,873,480

CLASS 324

58.5 R 4,873,481
71.4 4,873,482
72 4,873,483
95 4,873,484
96 4,873,485
307 4,873,486
314 4,873,487
339 4,873,488
453 4,873,489

CLASS 328

3 4,873,490
155 4,873,491

CLASS 330

86 4,873,492
285 4,873,493

CLASS 331

65 4,873,494
68 4,873,495
96 4,873,496
108 B 4,873,497
116 FE 4,873,498
117 R 4,873,499

CLASS 332

104 4,873,500

CLASS 333

204 4,873,501
216 4,873,502

CLASS 335

4,873,503
303 4,873,504

CLASS 336

92 4,873,505

CLASS 337

290 4,873,506

CLASS 338

22 R 4,873,507
25 4,873,508

CLASS 340

436 4,873,509
580 4,873,510
677 4,873,511
679 4,873,512
723 4,873,513
726 4,873,514
728 4,873,515
784 4,873,516
825.030 4,873,517
825.070 4,873,518
825.44 4,873,519
4,873,520
825.52 4,873,521
853 4,873,522
984 4,873,523

CLASS 341

73 4,873,524
145 4,873,525

CLASS 342

359 4,873,526

CLASS 343

700 MS 4,873,529
711 4,873,530
4,873,531
713 4,873,532
718 4,873,527
744 4,873,533
770 4,873,528
786 4,873,534

CLASS 346

1.1 Re.33,088
4,873,535
76 PH 4,873,536
108 4,873,537
139 R 4,873,538
140 R 4,873,539
4,873,622
160.1 4,873,540
4,873,541

CLASS 350

96.16 4,872,739
96.2 4,872,737
96.20 4,872,736
96.26 4,872,740
96.29 4,872,738
345 4,872,741
348 4,872,742
353 4,872,743
356 4,872,744
357 4,872,745
358 4,872,746
421 4,872,747
432 4,872,748

CLASS 351

44 4,872,749

CLASS 353

7 4,872,750

CLASS 354

400 4,873,542
402 4,873,543
457 4,873,544

CLASS 355

38 4,873,546
200 4,873,548
206 4,873,549
232 4,873,550
251 4,873,551
256 4,873,545
271 4,873,552
295 4,873,553
309 4,873,554
316 4,873,547

CLASS 356

35.5 4,872,751
39 4,872,752
246 4,872,753
350 4,872,754
360 4,872,755
361 4,872,756
376 4,872,757
381 4,872,758
432 4,872,759

CLASS 357

4 4,873,555
8 4,873,556
23.1 4,873,557
23.2 4,873,558
23.6 4,873,559
4,873,560
24 4,873,561
4,873,562
41 4,873,563
49 4,873,564
71 4,873,565
74 4,873,566

CLASS 358

12 4,873,567
22 4,873,568
75 4,873,569
80 4,873,570
93 4,873,571
98 4,873,572
133 4,873,573
139 4,873,574
166 4,873,575
224 4,873,576
254 4,873,578
310 4,873,581
4,873,582
4,873,583
335 4,873,580
4,873,584
4,873,585
342 4,873,586
426 4,873,577
471 4,873,579

CLASS 360

9.1 4,873,587
47 4,873,588
53 4,873,589
73.14 4,873,590
85 4,873,591
90 4,873,592
96.5 4,873,593
97.03 4,873,594
99.05 4,873,595
99.11 4,873,596
105 4,873,597
106 4,873,598
126 4,873,599

CLASS 361

64 4,873,601
78 4,873,602
96 4,873,603
104 4,873,604
143 4,873,605
152 4,873,606
210 4,873,607
220 4,873,608
232 4,873,609
313 4,873,610
315 4,873,611
321 4,873,612
385 4,873,613
394 4,873,614
395 4,873,615
426 4,873,600

CLASS 363

17 4,873,616
4,873,617
4,873,618
51 4,873,619
57 4,873,620

CLASS 364

150 4,873,621
188 4,873,623
200 4,873,624
4,873,625
4,873,626
4,873,627
4,873,628
4,873,629
4,873,630
405 4,873,631
413.08 4,873,633
413.13 4,873,632
419 4,873,634
422 4,873,635
4,873,636
424.1 4,873,637
426.01 4,873,638
426.02 4,873,639
426.04 4,873,640
431.04 4,873,641
431.06 4,873,642
468 4,873,643
478 4,873,644
479 4,873,645
480 Re.33,089
487 4,873,646
488 4,873,647
500 4,873,648
505 4,873,649
510 4,873,650
513 4,873,651
518 4,873,652
525 4,873,653
551.01 4,873,654
553 4,873,655
578 4,873,656
4,873,657
725 4,873,658
768 4,873,660
784 4,873,659
807 4,873,661
900 4,873,662

CLASS 365

73 4,873,663
145 4,873,664
154 4,873,665
189.01 4,873,669
189.07 4,873,666
4,873,667
189.09 4,873,668
189.11 4,873,670
189.12 4,873,671
218 4,873,672
230.06 4,873,673

CLASS 366

7 4,872,760
79 4,872,761
160 4,872,763
251 4,872,764

CLASS 367

57 4,873,675
98 4,873,676

CLASS 368

204 4,873,677

CLASS 369

13 4,873,678
32 4,873,679
59 4,873,680

CLASS 370

3 4,873,681
58.1 4,873,682
4,873,694
95.1 4,873,683
102 4,873,684

CLASS 371

8.2 4,873,687
21.2 4,873,705
22.4 4,873,686
36 4,873,685
37.1 4,873,688
4,873,689

CLASS 372

8 4,873,690
20 4,873,691
4,873,692
33 4,873,693
58 4,873,695
96 4,873,696
108 4,873,697

CLASS 373

156 4,873,698

CLASS 374

5 4,872,762
117 4,872,765

CLASS 375

1 4,873,699
27 4,873,701
76 4,873,700
4,873,702
118 4,873,703

CLASS 376

283 4,873,050
438 4,873,051

CLASS 377

47 4,873,704
85 4,873,706

CLASS 378

18 4,873,707
62 4,873,708
142 4,873,709
177 4,873,710

CLASS 379

58 4,873,711
4,873,712
67 4,873,713
88 4,873,714
93 4,873,715
134 4,873,716
156 4,873,718
157 4,873,717
215 4,873,719
356 4,873,720

CLASS 380

9 4,873,721

CLASS 381

17 4,873,722
34 4,873,723
40 4,873,724

CLASS 383

10 4,872,766

CLASS 384

4,872,767
223 4,872,768
226 4,872,769
484 4,872,770
492 4,872,771

CLASS 388

814 4,873,473

CLASS 400

120 4,872,772
144.2 4,872,773

CLASS 401

29 4,872,774
52 4,872,775
65 4,872,776
199 4,872,777
266 4,872,778

CLASS 403

171 4,872,779

CLASS 404

26 4,872,780

CLASS 405

12 4,872,781
24 4,872,782
186 4,872,783
270 4,872,784

CLASS 406

50 Re.33,084
68 4,872,786
155 4,872,785

CLASS 408

1 R 4,872,787
46 4,872,788
79 4,872,789
221 4,872,790

CLASS 409

12 4,872,791
131 4,872,792
244 4,872,793

CLASS 410

54 4,872,794

CLASS 411

433 4,872,795

CLASS 412

16 4,872,796
25 4,872,797

CLASS 414

141.3 4,872,798
180 4,872,799
278 4,872,800
409 4,872,801
417 4,872,802
730 4,872,803

CLASS 415

2.1 4,872,804
7 4,872,805
55.5 4,872,806
118 4,872,807
170.1 4,872,808
206 4,872,809

CLASS 416

145 4,872,810
162 4,872,811
190 4,872,812

CLASS 417

63 4,872,813
222 4,872,814
4,872,815
360 4,872,816
407 4,872,817

CLASS 418

36 4,872,818
61.3 4,872,819
220 4,872,820

CLASS 419

2 4,873,052
6 B1 4,236,923
11 4,873,053

CLASS 420

552 4,873,054
582 4,873,055

CLASS 422

61 4,873,056
75 4,873,057
89 4,873,058
100 4,873,059
135 4,873,060
188 4,873,061
249 4,873,062
250 4,873,063

CLASS 423

85 4,873,064
210 4,873,065
235 4,873,066
279 4,873,067
315 4,873,068
345 4,873,069
4,873,070
448 4,873,071
608 4,873,072
617 4,873,073

CLASS 424

1.1 4,873,074
4,873,075
10 4,873,076
44 Re.33,086
61 4,873,077
4,873,158
64 4,873,078
70 4,873,079
80 4,873,080
81 4,873,081
83 4,873,082
4,873,083
400 4,873,085
409 4,873,086
433 4,873,087
450 4,873,088
4,873,089
451 4,873,090
489 4,873,091
499 4,873,092
658 4,873,084

CLASS 425

9 4,872,821
48 4,872,822
64 4,872,823
113 4,872,824
117 4,872,825
388 4,872,826
526 4,872,827

CLASS 426

3 4,872,884
28 4,873,093
43 4,873,094
50 4,873,095
72 4,873,096
74 4,873,097
94 4,873,098
104 4,873,099
111 4,873,100
113 4,873,101
233 4,873,103
249 4,873,104
481 4,873,105
4,873,106
520 4,873,107
533 4,873,108
599 4,873,112
607 4,873,109
621 4,873,110
623 4,873,111

CLASS 427

2 4,873,113
27 4,873,114
34 4,873,115
37 4,873,117
39 4,873,118
4,873,119
64 4,873,120
77 4,873,121
96 4,873,123
97 4,873,122
130 4,873,102
207.1 4,873,124
248.1 4,873,125
282 4,873,126
365 4,873,303
376.8 4,873,127
434.7 4,873,128

CLASS 428

35.8 4,873,130
36.9 4,873,116
64 4,873,131
80 4,873,132
107 4,873,133
156 4,873,134
192 4,873,135
209 4,873,022
4,873,136
216 4,873,137
336 4,873,138
341 4,873,139
343 4,873,140
357 4,873,141
359 4,873,142
373 4,873,143
395 4,873,144
407 4,873,145
428 4,873,146
533 4,873,147
570 4,873,148
609 4,873,149
627 4,873,150
4,873,151
659 4,873,153
694 4,873,129
4,873,154

CLASS 429

26 4,873,155
31 4,873,156
57 4,873,157
120 4,873,159
170 4,873,160
225 4,873,161

CLASS 430

5 4,873,162
4,873,163
58 4,873,164
66 4,873,165
137 4,873,166
138 4,873,167
4,873,168
192 4,873,169
204 4,873,170
213 4,873,171
264 4,873,172
309 4,873,174
311 4,873,175
313 4,873,176
326 4,873,177
327 4,873,178
382 4,873,179
491 4,873,180
523 4,873,181
546 4,873,182
550 4,873,183
617 4,873,184
903 4,873,185
964 4,873,173

CLASS 431

16 4,872,828
33 4,872,829
54 4,872,830
73 4,872,831
90 4,872,832
354 4,872,833

CLASS 432

75 4,872,834
225 4,872,835

CLASS 433

5 4,872,836
29 4,872,837
31 4,872,838
173 4,872,839
4,872,840

CLASS 434

274 4,872,841

CLASS 435

1 4,873,186
5 4,873,187
7 4,873,188
68 4,873,189
172.3 4,873,190
4,873,191
4,873,192
198 4,873,194
254 4,873,195
4,873,196

CLASS 436

77 4,873,197
176 4,873,193

CLASS 437

5 4,873,198
31 4,873,199
4,873,200
51 4,873,201
62 4,873,202
67 4,873,203
200 4,873,204
4,873,205

CLASS 439

15 4,872,842
69 4,872,843
4,872,844
70 4,872,845
83 4,872,846
133 4,872,847
135 4,872,848
209 4,872,849
264 4,872,850
267 4,872,851
307 4,872,852
327 4,872,853
577 4,872,854
717 4,872,855
783 4,872,856

CLASS 440

1 4,872,857
38 4,872,858
53 4,872,859
113 4,872,860

CLASS 441

79 4,872,861

CLASS 445

22 4,872,862
45 4,872,863
50 4,872,864

CLASS 501

71 4,873,206
80 4,873,207
89 4,873,208
95 4,873,209
98 4,873,210

CLASS 502

64 4,873,211
158 4,873,212
161 4,873,213
185 4,873,214
202 4,873,215
211 4,873,216
311 4,873,217
418 4,873,218

CLASS 503

204 4,873,219
227 4,873,220

CLASS 514

18 4,873,221
21 4,873,222
23 4,873,223
30 4,873,224
41 4,873,225
46 4,873,226
47 4,873,227
49 4,873,228
54 4,873,229
60 4,873,230
159 4,873,232
179 4,873,233
211 4,873,234
220 4,873,236
222.8 4,873,237
227.8 4,873,238
4,873,239
231.5 4,873,240
237.8 4,873,241
242 4,873,242
248 4,873,243
250 4,873,244
4,873,245
252 4,873,246
257 4,873,247
269 4,873,248
275 4,873,249
290 4,873,250
303 4,873,251
4,873,334
312 4,873,235
315 4,873,252
352 4,873,253
356 4,873,254
369 4,873,255

CLASSIFICATION OF PATENTS

391 4,873,256
410 4,873,257
411 4,873,258
443 4,873,259
449 4,873,260
462 4,873,261
510 4,873,262
535 4,873,263
557 4,873,231
594 4,873,264
651 4,873,265
653 4,873,266

CLASS 518

700 4,873,267

CLASS 521

413 4,873,268

CLASS 523

115 4,873,269
128 4,873,270
136 4,873,271
212 4,873,272
407 4,873,273
500 4,873,274

CLASS 524

64 4,873,275
153 4,873,276
166 4,873,277
380 4,873,278
384 4,873,279
437 4,873,280
457 4,873,281
496 4,873,282
520 4,873,283
548 4,873,284

CLASS 525

28 4,873,285
92 4,873,286
4,873,287
194 4,873,288
293 4,873,289
337 4,873,290
348 4,873,291
408 4,873,292
417 4,873,293
419 4,873,294
420 4,873,295
434 4,873,296
474 4,873,297
479 4,873,298

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DESIGN PATENTS

01 : 303,942
04 : 303,875
06 : 303,867
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09 : 303,922
12 : 303,897
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17 : 303,876
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19 : 303,918
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21 : 303,919
24 : 303,920
26 : 303,916
27 : 303,901
29 : 303,913
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32 : 303,893
33 : 303,951
34 : 303,865
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303,928
36 : 303,880
303,881
303,884
303,899
303,900
303,911
303,914
303,925
303,954
303,978
37 : 303,883
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39 : 303,929
41 : 303,870
303,908
42 : 303,885
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303,926
44 : 303,878
48 : 303,889
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303,950
49 : 303,915
51 : 303,891
303,993
55 : 303,886
303,887

PLANT PATENTS

39 : 7,046
53 : 7,045

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